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BASELINE RISK ASSESSMENT

for the . . .

Skinner Landfill Site
West Chester, Ohio

prepared for . . .

U.S. Environmental Protection Agency
Region V
Chicago, Illinois

EPA Contract No. 68-W8-0079
EPA Work Assignment No. 04-5L73
WW Engineering & Science Project No. 04003

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WW Engineering & Science

FINAL DRAFT OF BASELINE RISK ASSESSMENT

SKINNER LANDFILL

WEST CHESTER, OHIO

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION V
CHICAGO, ILLINOIS

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LIST OF ACRONYMS

BL	Buried lagoon soil samples
BP	Buried pit soil sample
CDD	Chlorinated dibenzo-p-dioxins
CDF	Chlorinated dibenzofurans
CLP	Contract Laboratory Program
CRQL	Contract-required quantitation limits
DL	Detection limit
GW	Soil samples from well borings
HA	Hand-augered soil samples
HEAST	Health Effects Assessment Summary Tables
IRIS	Integrated Risk Information System
LOAEL	Lowest Observed Adverse Effect Level
LS	Leachate sediment
LW	Leachate water
NCP	National Contingency Plan
OEPA	Ohio Environmental Protection Agency
PAH	Polynuclear aromatic hydrocarbons
PCBs	Poly-chlorinated biphenyls
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QL	Quantitation Limits
RAS	Routine Analytical Services
RFD	Reference dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RPM	Regional Project Manager
RW	Residential wells (ground water samples)
SAS	Special analytical services
SF	Slope Factor
SF	Surface water samples
SM	Sediment samples
SQL	Sample Quantitation Limit
TIC	Tentatively Identified Compounds
U.S. EPA	United States Environmental Protection Agency
WESTON	Roy F. Weston Company, Inc.
WL	Waste Lagoon soil samples
WW	Ground water from corresponding GW locations
WWES	WW Engineering and Science

1.0 INTRODUCTION

1.1 OVERVIEW

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA, or "Superfund"), establishes a national program for responding to releases of hazardous substances into the environment. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is the regulation that implements CERCLA. Among other things, the NCP establishes the overall approach for determining appropriate remedial action at Superfund sites. The mandate of the Superfund program and the NCP is to protect human health and the environment from current and potential threats posed by uncontrolled releases or potential releases of hazardous substances. The Baseline Risk Assessment is used to evaluate the degree of the threats or potential threats to human health due to such releases or potential releases.

1.1.1 GENERAL SITE CHARACTERISTICS

The Skinner Landfill site is a 78 acre property. Portions of the site were used as a landfill for a variety of wastes and debris from 1934 through 1990. The site was placed on the United States Environmental Protection Agency National Priority List (NPL) in 1982. The Skinner Landfill accepted a variety of materials ranging from debris, municipal trash, and metal scraps to chemical waste. Studies have been conducted to characterize the nature and extent of contamination on the site.

1.1.2 OBJECTIVES

The objectives of the risk assessment are to:

- Provide an analysis of baseline risks and help determine the need for action at the site;
- Provide a basis for determining concentrations of chemicals that can remain on-site and still be adequately protective of human health and the environment;
- Provide a basis for comparing potential health impacts of various remedial alternatives; and
- Provide a consistent process for evaluating and documenting public health risks at the site.

This assessment has been conducted using the best available guidance and information available at present.

1.2 SITE BACKGROUND

1.2.1 SITE DESCRIPTION AND LOCATION

The landfill is located approximately 15 miles north of Cincinnati, Ohio, in Section 22 (T3N, R2W) of Butler County (see Figure 1). The landfill is located approximately one-half mile south of the intersection of Interstate 75 and the Cincinnati-Dayton Road, and one-half mile north of the town of West Chester.

The Skinner property is comprised of nearly 78 acres of hilly terrain, bordered on the immediate south by the East Fork of Mill Creek. The site is bordered to the north by woods and old fields, to the east by a Consolidated Rail Corporation (Conrail) right-of-way, to the south across the East Fork of Mill Creek by agricultural and wooded land and to the west by the Cincinnati-Dayton Road. The principal residential area is west of the landfill; however, approximately 13 residences are located within 2,000 feet of the landfill to the south, and west. A residential area is also located approximately 0.5 miles east of the landfill. Figure 2 depicts the topography and surface features of the site.

The area involved in the remedial investigation was property owned by Elsa Skinner (Mrs. Albert Skinner) and Ray Skinner, which includes the Skinner Landfill and adjacent areas. The predominant areas of investigation outside the landfill consisted of residential wells near the landfill and the East Fork of Mill Creek upstream and downstream of the site. Surface water, ground water, and soil samples were obtained from areas north and south of the landfill to characterize background levels (Figure 3) and to help determine risks to human health and the environment resulting from exposure to chemicals on the site.

1.2.2 GENERAL SITE HISTORY

The Skinner property, originally a sand and gravel operation, first became involved in landfill operations in 1934 with the disposal of general municipal refuse in abandoned sand and gravel pits. It is unknown exactly what materials were deposited in the landfill from 1934 until the present.

In 1959, the landfill was used for the disposal of scrap metal and general trash from a paper manufacturing plant. In the spring of 1963, the Butler County Board of Health (BCBH) approved the use of the site as a sanitary landfill. In 1963, during the permitting procedure, local residents opposed the landfill, stating that chemical wastes were being dumped there.

In April of 1976, numerous citizen complaints and a fireman's observation (made while fighting a fire at the site) of a black, oily liquid in a waste lagoon on the site prompted the Ohio Environmental Protection Agency (OEPA) to investigate the Skinner Landfill. Representatives of BCBH, OEPA, the Southwestern Ohio Air Pollution Control Agency (SOAPCA) and the Butler County Sheriff's Department (BCSD), after being denied access on April 22, 1976, entered the Skinner Landfill with a search warrant on April 26, 1976. Bill Kovacs, owner/operator of the Chem-Dyne Superfund site in Hamilton, Ohio, was also on-site at this time. According to the U.S. EPA's Regional Project Manager (RPM) responsible for this site investigation, Mr. Kovacs' role was as consultant and advisor to the Skinners. During this site visit the waste lagoon area showed evidence of recent grading. Over one hundred 55-gallon drums marked "Chemical Waste" were observed. In verification of these observations, OEPA inspection of aerial photos taken in early April of 1976 revealed a lagoon in the regraded area and several hundred drums scattered throughout the site.

The OEPA returned to the Skinner Landfill with a search warrant on May 4, 1976. The road leading to the waste lagoon was blocked by a bulldozer, claimed to be inoperable by Mr. Albert Skinner. When told that the OEPA would return with equipment to remove the bulldozer, Mr. Albert Skinner stated that the following materials were buried at the landfill: nerve gas, mustard gas, incendiary bombs, phosphorus, flame throwers, cyanide ash and explosive devices. At this time the OEPA withdrew from the site.

On May 11, 1976, representatives of the OEPA, the Army Special Unit and the BCSD entered the landfill to inspect and sample the waste lagoon area. Analysis of samples taken from a trench excavated at the lagoon site revealed pesticides, including chlordane intermediates, some volatile organic compounds and elevated concentrations of several heavy metals.

In response to these discoveries, the Skinners retained H.C. Nutting Company from July 1976 to July 1977 to conduct a shallow geologic investigation. Records of five soil borings, drilled 9 to 16.5 feet deep in the area of the lagoon, show mixed soils consisting of sand, silt, clay and gravel with an occasional mention of "organics" and "odor detected."

The OEPA made a subsequent site inspection in July 1977. It was revealed at this time, according to the U.S. EPA's RPM, that the Skinners had an agreement with Bill Kovacs to clean and maintain Chem-Dyne vehicles and tanks. WESTON's Phase I Work Plan states that the OEPA found leachate seeping from near the buried lagoon and a faint chemical odor near the buried lagoon. From August 1977 until January 1979, OEPA attempted without success to obtain a court order to force the Skinners to remove the chemical waste. Subsequent appeals by the OEPA were unsuccessful. The court did, however, prohibit future disposal of industrial waste at this site except under legal permit.

In July 1982, a Field Investigation Team (FIT) from CH2M Hill installed four ground water monitoring wells to characterize water quality beneath the buried lagoon area. Volatile organic compounds were detected in ground water collected from a monitoring well located southeast of the buried lagoon. In 1982, as a result of the FIT investigation, the Skinner Landfill was placed on the National Priority List (NPL) with a ranking of 659. This action prompted the initiation of a RI/FS with Phase I activities commenced by Roy F. Weston, Inc. (WESTON) in September 1984.

In the Spring of 1986, WESTON initiated the field investigation for Phase I of the RI. This initial investigation included a geophysical survey, the installation of eighteen ground water monitoring wells, and the sampling of ground water, surface water, and soils. A biological survey of the diversity of fish and macroinvertibrate fauna collected from the East Fork of Mill Creek and Skinner Creek was performed.

An additional round of ground water, surface water, sediment and soil sampling was performed in July 1987 in accordance with the recommendations outlined in the Phase I Interim Report. The results of these analyses are summarized in the Phase I Tech Memo, (WWES, 1990). A soil gas survey was also performed in the vicinity of the buried lagoon in an attempt to define specific areas needing further exploration.

Site access problems have occurred on several occasions since WWES began planning Phase II of the RI investigation. Briefly, these problems included the placement of demolition debris in an isolation area established by the U.S. EPA; refusal by the Skinners to allow access to land surveyors; refusal by the Skinners to permit the placement of a site office and equipment trailer; and a generally threatening disposition exhibited by the landfill operators and affiliates during the initial site visits. Although eventually resolved, these situations served to delay the start-up of the Phase II activities. Ultimately an administrative order to permit access by the U.S. EPA and it's subcontractors was issued to prevent future disruption in the work schedule. Additionally, the OEPA sought and achieved site closure to all landfilling activities in August 1990.

1.2.3 AREAS OF CONCERN

Several areas on the Skinner property were identified as areas of specific concern based on results from the Phase I investigation. These areas (which are potential areas of concern) include: the former waste lagoon (now buried); the buried pit area; remaining site-wide soils; ground water; surface water (ponds and creeks); and sediments (ponds and creeks). Sampling was conducted in each of these areas to define the nature and extent of contamination. Details regarding these areas of concern are presented in the Phase I and II Remedial Investigation (RI) reports (WESTON, 1988; WWES, 1991a).

1.3 SCOPE

WESTON was authorized to begin a Phase I Remedial Investigation (RI) on the property following the listing of the Skinner Landfill on the National Priority List (NPL) in 1982. Subsequently, WWES was contracted to perform a Phase II RI investigation. The conceptual model detailed below was used to develop the Phase II investigation. A summary of the Phase I investigation is presented in the Phase II RI report (WWES, 1991a). The Phase II RI report also contains details concerning the sampling and analytical procedures employed for the Phase II RI.

Investigations at the site included soil borings, surface soil sampling, surface water sampling, sediment sampling, installation of monitoring wells, ground water sampling, and a site survey.

1.3.1 CONCEPTUAL MODEL OF THE SITE

A conceptual model of the site and its history was developed prior to development of the work plan. The conceptual model included the following important elements:

- Wastes were disposed in abandoned sand and gravel pits and soils on the Skinner property over the course of fifty years;

- The wastes included municipal refuse, scrap metals, drums of wastes, and a variety of unknown materials;

- There is a potential that the wastes could leach from the soil to the ground water or to surface water through known seepage areas;

- Ground water may flow into one or more of the on-site creeks or ponds;

- Dumping may have occurred in the on-site ponds as aerial photos indicate roadways to all the ponds;

- It is possible that these on-site creeks and ponds could be impacted by waste materials carried in ground water;

- There is a potential for surface runoff to have carried materials into these creeks and ponds;

- Portions of the site known as the waste lagoon and buried pit areas may present a source of concentrated waste materials available for transport to ground water, surface water, and air;

- There is a potential for chemicals to volatilize from the soil to the air;

- There is a potential for the generation of fugitive dust in some areas of the property;

- There is potential for contamination of fish populations found in impacted surface water bodies;

- Significant numbers of edible plants do not occur at the site. The site is not used for gardening or raising livestock. The site is very small relative to the available wildlife habitat in the surrounding region, and is therefore not likely to affect the quality of wildlife as a source of food for human consumption;

- Potential human receptors include landfill workers, residents living on or adjacent to the property, persons who may use the property for recreation, and persons at nearby houses, businesses, a school, and a post office; and

- It was assumed that the site could be developed as a residential community in the future.

1.3.2 SOIL BORINGS

As part of the Phase II RI, twenty-two soil borings were installed at two locations: the buried pit (BP) and adjacent to and within the former waste lagoon (See Figures 4 and 5). The objectives of these soil borings were to determine if soils had been impacted by past landfilling activities in these areas. Samples were collected at approximately 2.5 foot intervals between 0 and 10 feet and at 5 foot intervals thereafter. Additional details regarding soils obtained from borings are provided in Section 2.0 of the Phase II RI report (WWES, 1991a). A summary of the soil analyses is provided in Appendix A for the Phase I and Phase II RI reports.

1.3.3 SURFACE SOIL SAMPLES

Hand auger borings were completed at three locations (See Figure 5). These locations were positioned between the active landfill area and the north (Duck) pond. The objective of these borings was to determine if the soil quality had been impacted by runoff from the landfill.

The soil samples were taken from six to twelve inches, designated the "A" samples, and from eighteen to twenty-four inches below the ground surface, the "B" samples. Additionally, a duplicate sample was collected from one sample interval to evaluate the quantitative results and a field equipment blank taken to evaluate the equipment decontamination procedures. Further details regarding the collection of surface soil samples are provided in Section 2.0 of the Phase II RI report (WWES, 1991a).

1.3.4 SURFACE WATER SAMPLES

Surface water from three creeks, three ponds, and three leachate seepage areas were sampled. Figure 6 includes these features and the sampling locations.

The creeks included the East Fork Mill Creek (referred to as Mill Creek), "Skinner Creek," and a very small creek on the east side of the active landfill area (referred to as "Dump Creek"). The ponds included a pond to the north of the active landfill area and north of the Skinner Landfill property and two ponds along Skinner Creek on the west side of the site. The pond north of the landfill is referred to as "Duck Pond," the northern pond along Skinner Creek is referred to as "Diving Pond," and the southern pond along Skinner Creek is referred to as "Trilobite Pond." Initial investigations focused on the ponds because aerial photographs of the site indicated these were roadways to each of them and waste may have been dumped in them. Data from the Phase II RI report (WWES, 1991a) indicate that ponds were likely not used for waste dumping but may have been impacted through surface runoff of contaminants. Two leachate seepage areas along Mill Creek had been identified in the Phase I study and were included in the Sampling Plan for the Phase II study. The seepage area sampled along Skinner Creek was identified during implementation of the Phase II study. Changes in site conditions altered the locations of some samples collected. All changes in sample locations are described in the Phase II RI report (WWES, 1991a).

The surface water samples were collected from two depths in Trilobite Pond. The "A" samples were collected from near the surface and the "B" samples were collected from near the bottom. Surface water samples collected for the analysis of inorganic parameters were filtered. All other surface water samples were unfiltered. Additional details regarding the collection of surface water samples are provided in Section 2.0 of the Phase II RI report (WWES, 1991a). A summary of the surface water analyses is provided in Appendix A.

1.3.5 Sediment Samples

The locations of sediment samples are depicted in Figure 6. Samples were collected from approximately the 0-6 inch depth interval in the sediments. Sediments were also collected from the leachate seepage areas. Details regarding the collection of sediment samples are provided in Section 2.0 of the Phase II RI report (WWES, 1991a). A summary of the sediment analyses is provided in Appendix A.

1.3.6 Monitoring Wells

Thirteen monitoring wells were installed at the Skinner site as part of the Phase II RI. The data used from these wells was intended to help better define the ground water flow conditions and shallow bedrock hydrogeology, evaluate the hydraulic relationships between the surface water and ground water, better characterize ground water contamination, and to estimate the extent and rate of contaminant migration. Monitor well locations are presented in Figures 4 and 5. Ground water samples collected for the analysis of inorganic parameters were filtered. All other ground water samples were unfiltered. Further details regarding the installation and sampling of monitoring wells are provided in Section 2.0 of the Phase II RI report (WWES, 1991a). A summary of the sediment analyses is provided in Appendix A.

1.3.7 SITE SURVEY

The ground surface elevations and horizontal locations of all sampling points were surveyed. Ground surface elevations and the elevations of the tops of the well casings were obtained for monitoring wells. The results of the site survey are presented in the Phase II RI Report (WWES, 1991a).

1.3.8 SAMPLE COLLECTION AND LABORATORY METHODS

The Quality Assurance Project Plan (QAPP) Addendum (WWES, 1989) specified all sample collection, handling and shipping methods. These were conscientiously followed in order to meet the required quality criteria for developing defensible data. The QAPP Addendum also referenced in detail all analytical methods for CLP (Contract Laboratory Program) and non-CLP laboratory analyses that were used for the Skinner Landfill samples. Any deviations from the QAPP were discussed in Section 2.0 of the Phase II RI report (WWES, 1991a), and in the task-specific technical memoranda.

Chemical data validation included an independent review and quality assessment of the analytical methods performed on the samples. This review was performed by the Central Regional Laboratory (CRL). WWES laboratory staff summarized the CRL quality assurance laboratory reviews. These summaries were used by WWES staff during the data review, database development, and the preparation of the Phase II RI report (WWES, 1991a).

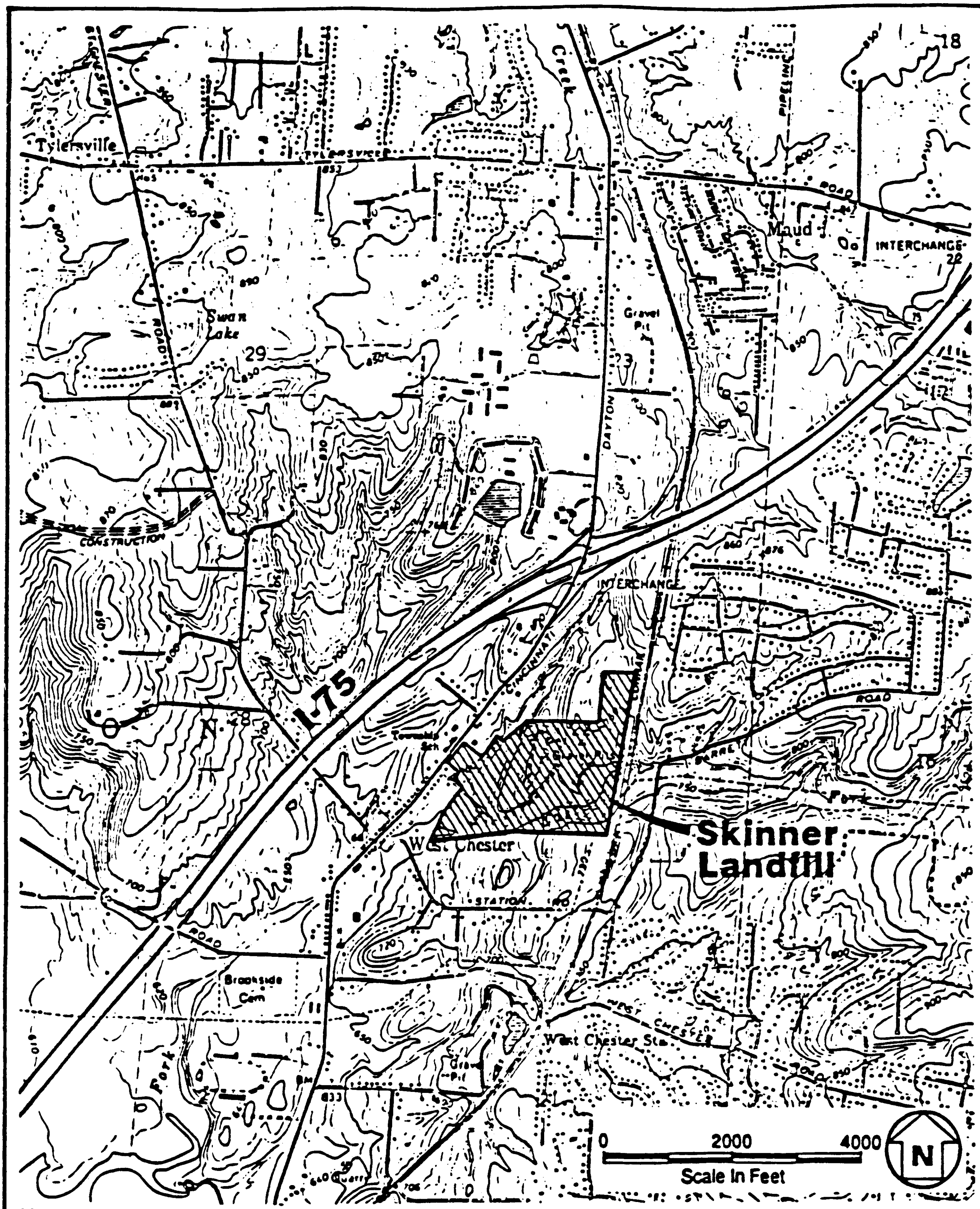
1.3.9 DATA QUALITY OBJECTIVES

The data quality objective was to collect data sufficient in quality and quantity to support a baseline risk assessment. All procedures outlined in the QAPP Addendum Report (September, 1989), were conscientiously adhered to; any deviations from the QAPP are discussed in Section 2.0 of the Phase II RI Report (WWES, 1991a).

1.4 ORGANIZATION OF THE BASELINE RISK ASSESSMENT

This Baseline Risk Assessment follows the U. S. EPA "Risk Assessment Guidance for Superfund" (U. S. EPA, 1989a). Section 2.0 identifies the chemicals of potential concern. Section 3.0 is the exposure assessment. Toxicity values and the toxicity of each chemical of potential concern are reviewed in Section 4.0. Section 5.0 evaluates the existing and potential risks due to exposure to the site and Section 6.0 discusses environmental impacts to the East Fork of Mill Creek. Section 7.0 summarizes the Baseline Risk Assessment. References are provided in Section 8.0. A list of acronyms used throughout this report is presented after the table of contents.

Figures



Map copied in part from USGS Glendale Quadrangle (7.5 minute)

Figure 1

Site Location Map

Skinner Landfill

West Chester, Ohio

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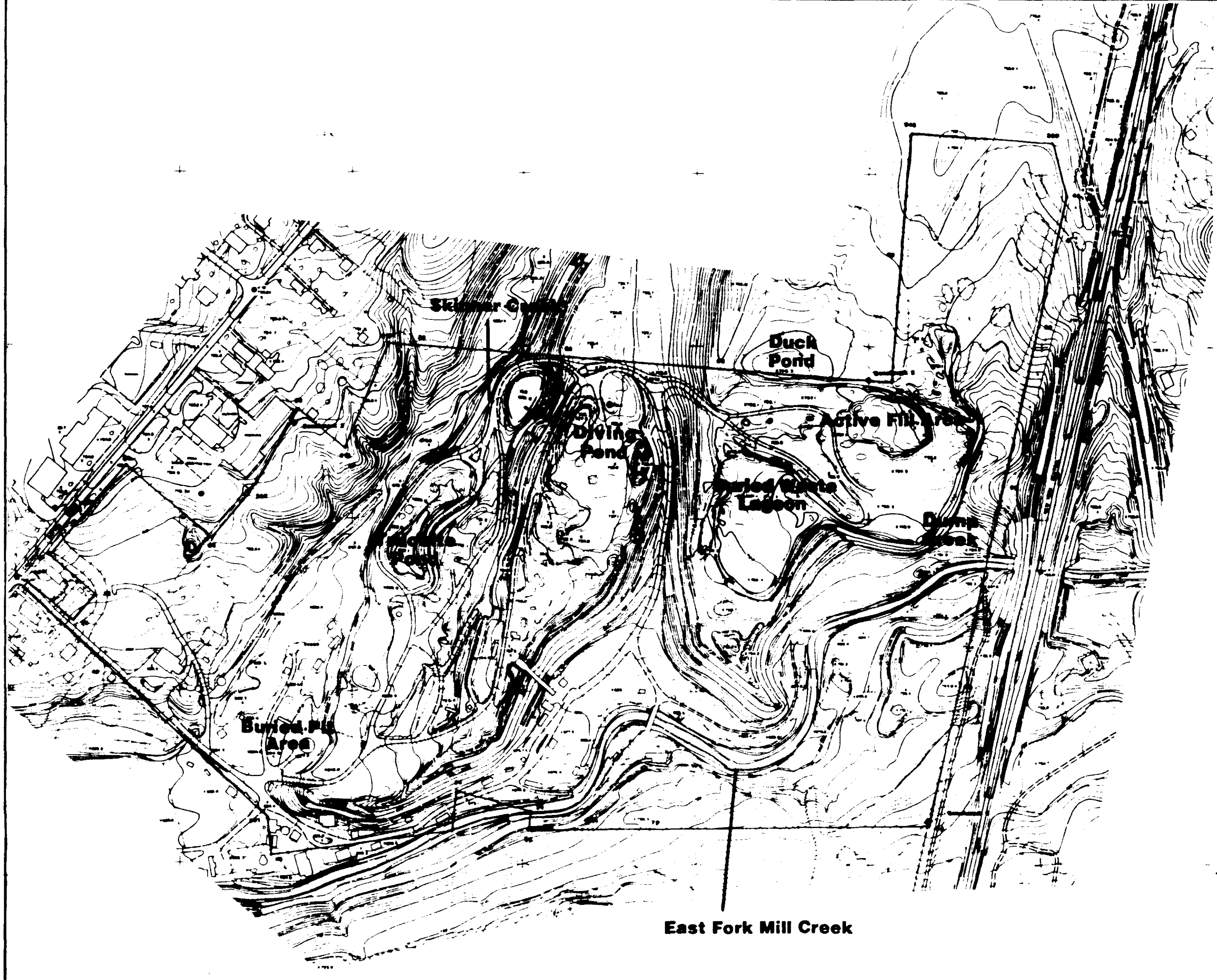

N

0 150 300 600

Scale in Feet

Figure 2
Topographic Map

SKINNER LANDFILL
West Chester Ohio

November, 1990

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LEGEND

- Phase I Surface Soil Sample
- Phase I/Pre-Phase I Monitoring Well
- Phase II Monitoring Well (Phase II Soil Sample from GW-35 Only)
- SW/SS Phase I Surface Water and Sediment Sample (Approximate Location)
- SF/SM Phase II Surface Water and Sediment Sample

N

0 150 300 600

Scale in Feet

Figure 3

Background Sample Loc
ALL MEDIA

Skinner Landfill
West Chester Ohio

April, 1991

■ Phase I/Pre-Phase I Monitoring Well

▲ Phase I Abandoned Monitoring Well

Phase I Surface Soil Sample

● Phase II Monitoring Well

Phase II Buried Pit Boring

Note: Former Locations of B-6, B-7, and Surface Soil Samples are Approximate

N

0 150 300 600
Scale in Feet

Figure 4

Site Map with Monitoring Well and Buried Pit Boring Locations

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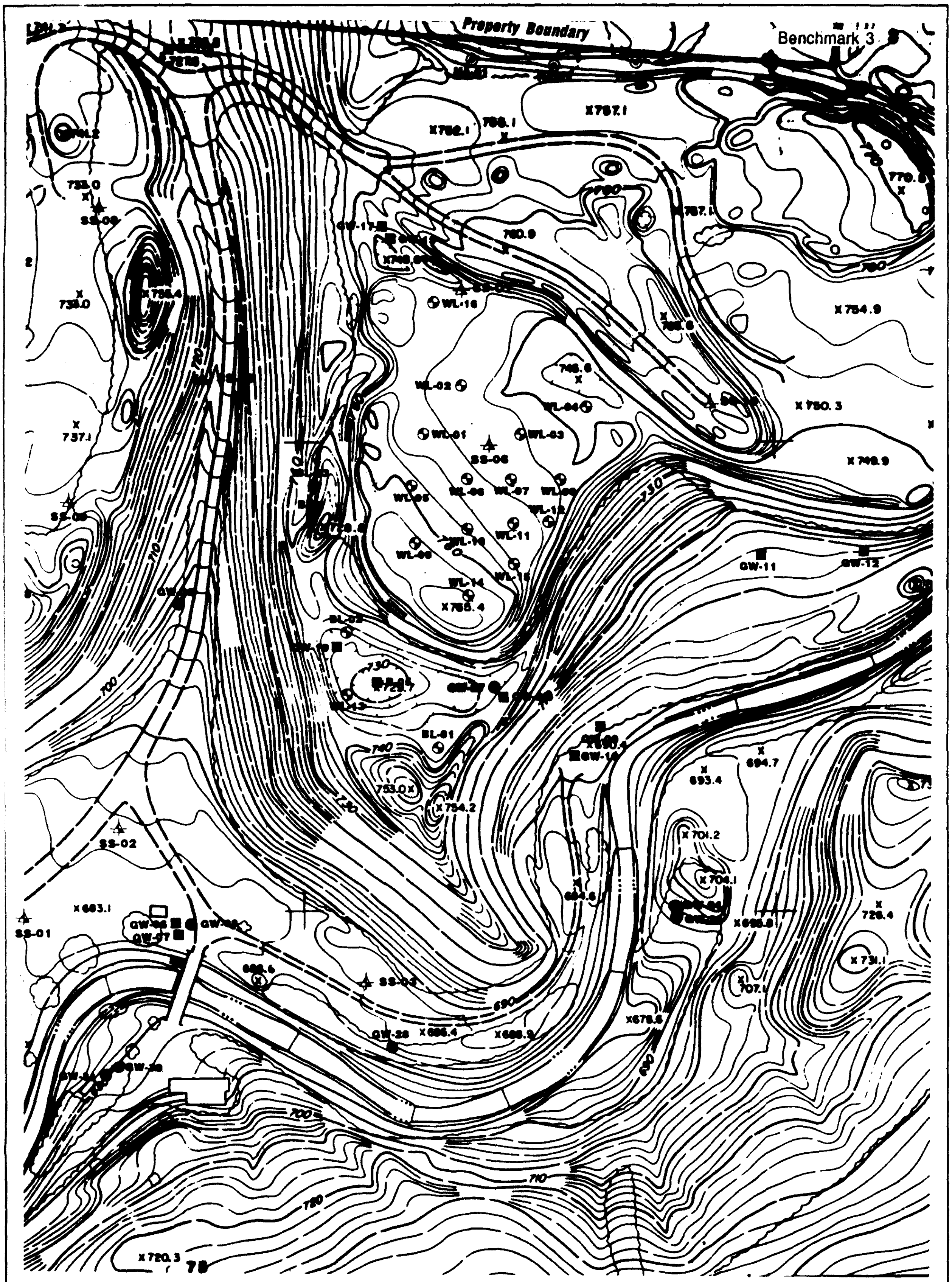

LEGEND

- Phase I/Pre-Phase I Wells
- Phase I Surface Soil Samples (Approx. Loc.)
- Phase II Soil Boring/ Monitoring Well
- Phase II Soil Boring
- Phase II Hand Auger

N

0 50 100 200

Scale in Feet

Figure 5

WASTE LAGOON AREA

Monitor Well and Soil Boring Location Map

Skinner Landfill

West Chester, Ohio

November, 1990

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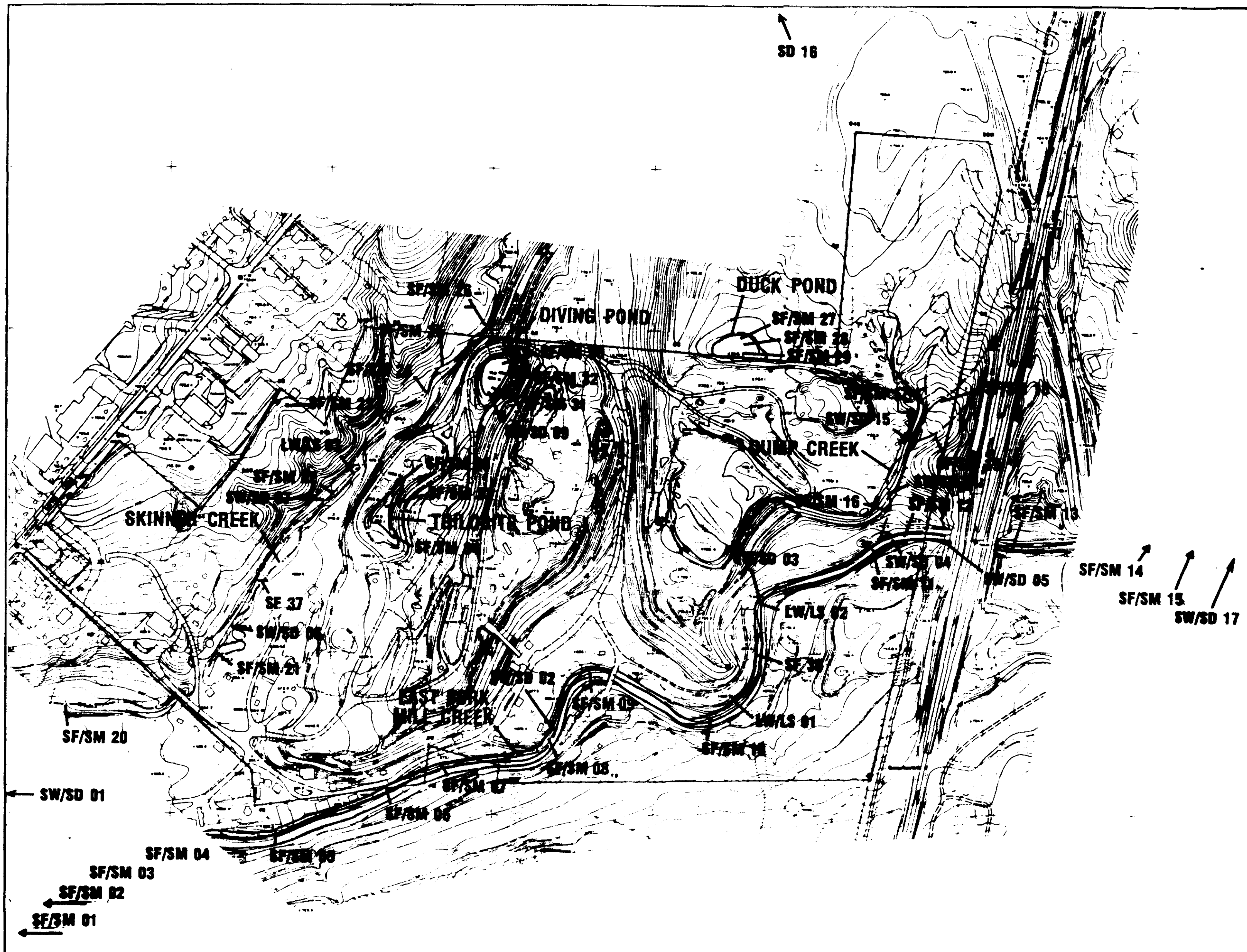

LEGEND

SW/SD 01	Phase I Surface Water & Sediment Sample (Approximate Location)
SF 37	Phase II Surface Water Samples
SF/SM 01	Phase II Surface Water and Sediment Sample
LW/LS 01	Phase II Leachate Water and Sediment Sample

N

0 150 300 600
Scale in Feet

Figure 6
Surface Water, Sediment and Leachate Sampling Locations
SKINNER LANDFILL
West Chester, Ohio

November, 1990 04003.13

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2.0 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

The purpose of the data evaluation is to develop a list of chemicals of potential concern that will be evaluated in the remainder of the risk assessment. Development of this list includes the following basic steps:

(1) gathering all data available from the Phase I and Phase II site investigations and sorting the data by medium;

(2) evaluating the analytical methods used;

(3) evaluating the quality of data with respect to sample quantitation limits;

(4) evaluating the quality of data with respect to qualifiers;

(5) evaluating the quality of data with respect to blanks;

(6) evaluating tentatively identified chemicals;

(7) comparing potential site-related concentrations of chemicals with background concentrations;

(8) grouping certain chemicals by class;

(9) evaluating frequency of detection;

(10) evaluating essential nutrients;

(11) developing a set of data for use in the risk assessment;

(12) documentation of rationales for eliminating chemicals from list of chemicals of potential concern.

A second purpose of the data evaluation is to report measured concentrations of the chemicals of potential concern in each appropriate medium.

2.1 DATA COLLECTION

Detailed information concerning the location of samples, background sampling, sampling methods, QA/QC methods, and special analytical services (SAS) can be found in the Phase II RI Report (WWES, 1991a). Samples were collected at the locations shown in

Figures 2 through 5. The Phase II sample data were divided into different series, labeled as:

- BL - Buried Lagoon (soil samples)
- BP - Buried Pit (soil samples)
- GW - Soil samples (from well borings)
- HA - Hand Auger (soil samples)
- LS - Leachate Sediment
- LW - Leachate Water
- RW - Residential Wells (ground water samples)
- SF - Surface water
- SM - Sediment
- WL - Waste Lagoon (soil samples)
- WW - Ground water (same locations as corresponding GW samples)

Analytical data from the WESTON and WWES investigations were entered into a database for easier manipulation and analysis. Queries of the database produced tables for each medium, listing all chemicals analyzed in the medium, the detected concentration (or sample quantitation limit), and data qualifiers in each sample. After collection and compilation of the data, the data were evaluated to ensure accuracy and quality. The data were tabulated in the Phase II RI and a data summary for each medium is presented in Appendix A.

Pre-RI data were also available but was not used in the quantitative risk assessment because there was little or no documentation available as to sample collection procedures, lab QA/QC, and sample locations. The pre-RI data were determined to be unusable for the risk assessment.

2.2 GENERAL SITE-SPECIFIC DATA EVALUATION CONSIDERATIONS

This section describes the general steps used in the evaluation of the data. The application of these steps is presented in Sections 2.3 through 2.10. Table 2-1 summarizes the chemicals that were analyzed for and the step in which a chemical was deleted from further consideration in a given medium or area of concern. Table 2-1 also identifies (by shading) the chemicals that were included as chemicals of potential concern for each medium or area of concern.

2.2.1 Steps Used in Data Evaluation

The data were evaluated in several steps to develop a list of chemicals of potential concern for use in the risk assessment, according to the procedures described by U.S. EPA, (1989a). These steps are described below.

2.2.1.1 Evaluation of Analytical Methods

All samples from the WWES investigation were analyzed under the U.S. EPA's Contract Laboratory Program (CLP) according to U.S. EPA guidelines. Inorganics, semi-volatile organics, and pesticides were analyzed using routine analytical services (RAS). Volatiles plus methylene chloride, alternate pesticides, and chlorinated dibenzo-p-dibenzo dioxins and furans were analyzed using special analytical services (SAS). These analyses yielded data appropriate for use in a quantitative risk assessment. Field screening analyses such as organic vapor detector readings were excluded from consideration.

Data from the Phase I investigation were also analyzed under the CLP program. The data evaluation was based on the summary of the data provided in the Phase I RI report (WESTON, 1988). Because of this, some of the data evaluation steps did not apply to the Phase I data. The data in the Phase I report are appropriate for use in a risk assessment, except as described in the sections below.

2.2.1.2 Evaluation of Quantitation Limits

In this step, quantitation limits and detection limits (QLs and DLs) for all of the chemicals assessed at the site were evaluated. This evaluation may have resulted in the use of "proxy" (or estimated) concentrations and/or the elimination of certain chemicals from further consideration (because they are believed to be absent from the site).

Quantitation limits of certain chemicals may be greater than standards, criteria or concentrations derived from toxicity reference values. This could result in the undetected presence of a chemical above its toxicity-based reference concentration. Some of the current Contract-Required Quantitation Limits (CRQLs) are currently above such standards for some chemicals (although the laboratories conducting the analyses can sometimes achieve QLs below the CRQL). In those cases, time constraints did not allow for a re-analysis using SAS and, therefore, the risk associated with that chemical could not be addressed quantitatively. Appendix B lists the CRQL and reference concentration for each chemical and documents how the reference concentrations were derived. All CRQLs which exceed reference concentrations are identified in Appendix B.

Some samples from the site had analytical problems (e.g., matrix interferences) which resulted in Sample Quantitation Limits (SQLs) which exceeded detected values in other samples in the medium. In such cases, the high SQL was not significant enough to raise the exposure concentration above the detected concentration of that chemical. This evaluation did not result in the exclusion of any data.

Chemicals which were analyzed for were typically detected in only some of the samples in a given medium. For the WWES samples in which a chemical was detected in only some of the samples, one half of the SQL was used as a proxy concentration for samples not containing that chemical in determining the concentration at the point of exposure (as described in Section 3.3). The Phase I data summaries did not provide SQLs, only "ND" for chemicals which were not detected. Therefore, it was not possible to use one-half of the SQL as a proxy concentration for Phase I samples. Such data were excluded from consideration because it was not reasonable to substitute zero for the Quantitation Limit (QL).

Some chemicals were not detected at all in a given medium and therefore were eliminated from the quantitative risk assessment. It is possible that some chemicals never detected occur at the site below the quantitation limit. However, this is unlikely considering the extent of investigations conducted at the site.

2.2.1.3 Evaluation of Qualified and Coded Data

Various qualifiers and codes (hereafter referred to as qualifiers) are attached to certain data by either the CLP laboratories conducting the analyses or by persons performing data validation. These qualifiers pertain to Quality Assurance/Quality Control (QA/QC) problems and generally indicate questions concerning chemical identity, chemical concentration, or both. The data qualifiers, whose meanings are defined under the CLP program, were evaluated using the following guidelines. Data qualified with an R (indicating unusable data) were excluded. Data qualified with a U (compound analyzed for but not detected) were retained, using one half of the reported SQL, as described above. Certain data had qualifiers that were not defined under the CLP program. These data were evaluated according to the meaning given by the laboratory which conducted the analysis, as described in the relevant sections below. All other qualifiers indicated only uncertain concentrations and were treated as unqualified data in the quantitative risk assessment.

Some of the data from the third round of samples from Phase I were qualified with a J, but the J was defined in the footnote as "Material Analyzed For, but Not Detected. Estimated Quantitation Limit". This meaning is different from the CLP definition of this qualifier. Therefore, this qualifier was changed to a Y for purposes of data evaluation and the data were treated as non-detected concentrations.

2.2.1.4 Comparison of Concentrations Detected in Blanks with Concentrations Detected in Samples

Blank samples provide a measure of contamination that has been introduced into a sample set either in the field while the samples are collected and transported to the laboratory or in the laboratory during sample preparation and analysis. To prevent the inclusion of non-site-related contaminants in the risk assessment, the concentrations of chemicals detected in blanks were compared with concentrations of the same chemicals detected in site samples. The analytical results of blank samples collected in a given medium were compared with all of the samples in that medium. The maxima of the detected concentrations of chemicals in blanks were used for the comparison to the sample. If a common laboratory contaminant (acetone, 2-butanone, methylene chloride, toluene, and phthalate esters) was detected in a sample at less than ten times the concentration detected in the blanks, then the reported detected concentration in the sample was treated as the quantitation limit (the chemical was treated as not detected in the sample). For all other chemicals detected in blanks the sample concentration was changed to the quantitation limit if the sample concentration was less than five times the blank concentration. Chemicals which were deleted from an area of concern based on this step are indicated by a (1)b in Table 2-1.

There were no blank samples reported in the Phase I summaries, but some of the data (mostly common laboratory contaminants) were qualified with a B (compound detected in blank sample). The reported concentrations of these compounds were comparable to the concentrations in the Phase II data for the same compounds in the same media where blank contamination was also encountered. Therefore, the Phase I data qualified with a B were assumed to be less than the appropriate factor detected in the blank sample and were treated as not having been detected in the sample.

2.2.1.5 Evaluation of Tentatively Identified Compounds

A list of all tentatively identified compounds (TIC's) and their estimated concentrations was compiled and examined to determine relative numbers of TIC's to non-TIC's and also to evaluate the estimated concentrations.

2.2.1.6 Comparison of Chemical Concentrations with Background

This step involved the comparison of concentrations of inorganic parameters found at the site with background concentrations to identify which chemicals were occurring at concentrations significantly higher than background. Background and foreground surface water, sediment, soil and ground water samples were collected from the site and analyzed. One half of the SQL was used as a proxy for chemicals which were not detected in a sample. Phase I background and foreground samples were also used in the statistical analysis. None of the background data were used for the quantitative risk analysis.

Background concentrations were compared with foreground concentrations using the Student "t" test for testing the difference between two means (assuming unequal foreground and background variances) with a 95 percent level of confidence. In some cases where the background data for a particular inorganic parameter consisted of all non-detects, a confidence interval based on the Student "t" statistic and a 95 percent level of confidence was constructed based on the foreground data and compared to one half of the average SQL in the background data. This method of comparison is described in the U.S. EPA document, "Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities" (U.S. EPA, 1989d) as referenced by the Human Health Evaluation Manual (U.S. EPA, 1989a) for comparisons between foreground data and a single value. Foreground concentrations were considered significantly higher than background concentrations if the background value fell below the lower limit of the confidence interval. A confidence interval was also used when background data for a particular area of concern consisted of only one sample (Dump Creek and Skinner Creek surface water, Dump Creek sediments and the bedrock wells); in this case the confidence interval based on foreground data was compared to the actual background concentration (or one half of the background SQL for chemicals which were not detected). If a chemical was not detected in any foreground samples for a particular area, it was deleted from the list of chemicals of concern for that area. In some cases, chemicals were deleted from the list of chemicals of concern for a particular area due to the previous data evaluation steps and were not analyzed statistically.

Certain chemicals deleted in this step were added back into the data base based on best professional judgement. Considerations in using best professional judgement include chemical concentrations, toxicity of the chemical, and a review of background and foreground concentrations. Table 2-1 summarizes the deletion of chemicals from the list in each area of concern and the addition of chemicals based on best professional judgement. Chemicals which were deleted from the list in an area of concern based on comparison with background concentrations are indicated by a (2) in Table 2-1. Results of the additional steps are described in the following sections.

2.2.1.7 Further Limitation of the Data

The final list of chemicals of potential concern was still very long following the above data evaluation. Therefore, additional screening steps were used to further reduce the list. The Regional Project Manager (RPM) was contacted and had no objections to the use of the additional screening steps.

Some chemicals were grouped together by class. All of the dioxins and dibenzofurans were grouped together in a class, according to the procedures in Appendix C, and were evaluated using toxicity information for 2,3,7,8-TCDD. In addition, toxicity values for total chlordane were used for alpha- and gamma-chlordane, as described in Section 4.3.1.

Some chemicals were detected infrequently at the site. Therefore, the frequency of detection in each area of concern was evaluated and those chemicals which were detected less than 5 percent of the time in any area of concern were deleted from the list. If there were fewer than 20 samples for a particular area of concern no chemicals were deleted using this procedure. The following sections describe which chemicals were deleted based on this step.

The third additional screening step used was eliminating any remaining essential nutrients from the list of chemicals which were present at relatively low concentrations at the site and which are toxic only at high doses. Total intake concentrations (mg/day) were calculated for calcium, iron, magnesium, potassium, and sodium as described in Section 3.6. These total intakes were then compared to recommended dietary allowances (National Research Council, 1989) for both children and adults because toxicity values were not available from the U.S. EPA (as described in Section 4.0) nor the open literature. Calcium, magnesium and potassium were deleted from the list of chemicals of potential concern for all areas in which concentrations were higher than background because the maximum potential intakes of these chemicals for all current and future populations (as described in Section 3.0) were only 1 - 15% of the recommended daily allowances for these nutrients. Potential intakes of iron for current and future residential populations and future occupational populations exceeded the recommended daily allowance of iron. Potential intakes of sodium for the future residential population exceeded the recommended daily allowance of sodium for this population. The toxicity of iron and sodium is discussed in greater detail in Section 4.0.

The recommended daily allowances are minimum intakes considered essential for good nutrition, not toxicity based values. Therefore, the potential intakes of iron and sodium in excess of the recommended daily allowances does not indicate that there is a health risk associated with these intakes.

2.2.1.8 Development of a Set of Chemical Data and Information for Use in Risk Assessment

The result of the previous data evaluation steps produced a set of data suitable for use in a quantitative risk assessment. The data were grouped into eight areas of concern for quantitative analysis in the risk assessment and are described in greater detail in the sections below. Table 2-1 lists the areas of concern and summarizes the reasons that chemicals were deleted from the list for an area.

2.2.2 QUALITY ASSURANCE/QUALITY CONTROL METHODS

Analytical data which were entered into the database were checked by a minimum of 3 people before the database was finalized. Data were analyzed using electronic spreadsheets and related "macro" programs which performed standardized tasks. All macros were fully tested on sample data prior to use in the data evaluation process to ensure that there were no errors. For non-standardized procedures, evaluation work was checked by two people to ensure quality.

2.2.3 GENERAL DATA UNCERTAINTY

The quantity of data was generally sufficient to reasonably characterize the site, although there were few surface soil samples in the waste lagoon to characterize current exposures. In some of the areas of concern there were insufficient background data to characterize background concentrations in a statistical comparison. (One background sample each was taken for Skinner Creek surface water, Dump Creek sediments and surface water, and the bedrock wells.) Uncertainty is introduced when insufficient data are used to characterize the background concentrations which may result in under- or overestimation of chemical intakes.

Only one Phase II background sample was taken for soils. There were sufficient historic background soil samples to supplement this and to reasonably characterize background concentrations, although it is uncertain whether these represent current conditions.

Proxy concentrations of one half of the SQL were used when chemicals were not detected in some of the samples for a given medium. This is only an estimate of the concentration of chemicals which may or may not be present at the non-detected location. Although there are other methods for handling values of non-detected chemicals, the method chosen produces reasonable estimates for characterizing the overall concentrations of chemicals because it does not systematically overestimate or underestimate concentrations.

SQLs were not provided for the Phase I data; therefore, it was not possible to determine a proxy concentration for concentrations reported below the SQL. Instead, concentrations which were not detected could not be quantified and were excluded from consideration. This causes uncertainty by overestimating concentrations because only those Phase I samples in which a concentration was detected were included. This uncertainty will result in a more conservative risk assessment.

There were some chemicals which were analyzed for at the site and were not detected but which have CRQLs exceeding toxicity-based reference concentrations (see Appendix B). This may have resulted in the deletion of chemicals that may be present at concentrations that are a potential health risk.

A majority of the analytical data from the site were qualified in some way. Most of the qualifiers indicated that the chemical was not detected in a sample. Some of the qualifiers indicated that the reported concentration of the chemical in the sample was estimated due to various problems. This estimation of concentrations will contribute to the uncertainty of the data. There were also a few data which were qualified as unusable; these data were excluded and do not contribute to uncertainty in the risk assessment.

Phase I data for the site were not obtained from original laboratory data packages but were obtained from summary tables presented in the Phase I Interim Remedial Investigation Report (WESTON, 1988). Qualifiers presented on the WESTON tables for Round III samples conflicted with those provided for use under the CLP program and exact meanings were unclear. A qualifier of "J" was used and defined as "Material analyzed for, but not detected. Estimated quantitation limit". The estimated quantitation limits were used in these cases, contributing to the uncertainty of the data.

Hexane and hexadecanoic acid were the only TIC's detected at the site. Hexane was identified in two buried pit samples (02C and 02D) at estimated levels of 0.0062 mg/kg and 0.0096 mg/kg. Hexadecanoic acid was identified in one buried lagoon (BL) sample (03A-DP) at an estimated level of 0.2 mg/kg. These estimated concentrations for the TIC's were relatively low. Therefore, no TIC's were included in the risk assessment. If the identified compounds are actually present, they would contribute to the risk associated with the site, although it is not possible to characterize this risk.

Concentrations of chemicals detected in blanks were compared to concentrations detected in site samples by grouping the blanks within a particular medium and comparing the maximum value detected in blanks to all site samples within that medium. Generally, blank data should be compared with results from samples with which the blanks are associated. Samples were grouped because it was not possible to make this association. This procedure may have excluded a few chemicals from the data set used in the risk assessment.

Blank samples were not summarized on the WESTON tables. Therefore, it is possible that some of the detected concentrations of the chemicals in Phase I data resulted from outside contamination and were not representative of actual concentrations present at the site. This uncertainty will result in a more conservative risk assessment and will not cause the exclusion of chemicals in Phase I data which may be present at the site.

Chemicals which were not detected in any of the media of concern were excluded from the risk assessment. These chemicals could be present at concentrations below the SQL and could add to the overall risk at the site.

Background comparisons were made to determine if concentrations of inorganic chemicals found at the site were significantly higher than background concentrations. Chemicals which were not significantly higher than background in any of the media of concern were excluded from the risk assessment. In statistical analysis there is a potential to incorrectly conclude, based on sampled data, that there is a significant difference in relative chemical concentrations when the difference is insignificant, or to conclude that there is no difference when there actually is. Chemicals may have been excluded in this step which were present at concentrations significantly higher than background and could add to overall risk, however, this is unlikely. Results of statistical comparisons were evaluated for reasonableness. In some cases, chemicals were retained according to best professional judgement based on chemical concentrations and toxicity and a review of background and foreground concentrations.

Because there was a long list of chemicals of potential concern after the initial data evaluation process, additional screening steps were taken to further reduce the list. Chemicals which were detected in five percent or fewer samples in all areas of concern were deleted from the list. This creates uncertainty because there were chemicals detected at the site that were not carried through the risk assessment. This step was considered reasonable because the risk associated with these chemicals was assumed to be significantly less than those which were detected more frequently and at higher concentrations at the site.

Uncertainty is also introduced in the grouping of chemicals by class (PCBs, etc.). Sections 3.0 and 4.0 discuss this uncertainty in greater detail.

2.3 WASTE LAGOON AREA

Soil borings in the waste lagoon area were drilled and samples collected as described in the WWES (1991a) and WESTON (1988) Remedial Investigation reports. This area includes all samples from the waste lagoon (WL) and buried lagoon (BL) series, ground water (GW 27 B-F) (WWES), and SS06 (WESTON). The sample locations are shown in Figure 5.

Data from soil samples were tabulated and are presented in the Phase II RI report (WWES, 1991). A summary of the waste lagoon soil data is presented in Appendix A-1. Table 2-2 denotes the chemicals of concern for this area. The background soil samples for the waste lagoon are described below.

Analytical methods, quantitation limits, and qualified data were evaluated, as described in Section 2.2.1.3. There was an additional qualifier attached to some of the data which is not part of the CLP program, but was defined by the laboratory performing the analysis. The qualifier was designated as a Y and defined as "Concentration reported is outside of the linear range of the pesticide standards." This indicates an uncertainty in the concentration, but not in the identity of the compound. Therefore, data with this qualifier were treated as data with a J qualifier (estimated concentration) and were not excluded.

There were 21 blank samples collected with the WL series and 4 blank samples collected with the BL series during the WWES investigation. The sample concentrations in each series were compared with the concentrations detected in their respective blank samples, as described in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. The TIC evaluation of this area is discussed in Section 2.2.1.5.

Background soil samples which were used for comparison with waste lagoon area soils included four current samples (GW-35A, C, D, and E) and nine historic samples (SS11-01; SS12-01; SS13-01; SS14-01, 02, and DP; SS15-01, 02, and DP).

Statistical comparisons were performed to compare foreground concentrations of inorganic chemicals with background concentrations. The Student "t" test was performed for all chemicals which were detected at least once in background data. If background data for a chemical consisted of all non-detectable concentrations, a confidence interval was constructed based on foreground data with a 95 percent level of confidence. This confidence interval was then compared to one half of the average SQL in background data.

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. Some inorganic chemicals which may have been deleted in this step (e.g., they were present at concentrations which were not significantly greater than background) were retained according to best professional judgement as described in Section 2.2.1.6. These chemicals are indicated by a (3) in Table 2-1.

The remainder of the chemicals excluded from the risk assessment prior to comparison with background had been deleted in previous steps as described in Section 2.2.1 or were not detected in foreground samples in the waste lagoon and were deleted from the list of chemicals of concern for that area without statistical analysis. These chemicals are indicated by a (1) in Table 2-1.

Following the above data evaluation for the waste lagoon area the additional steps described in Section 2.2.1.7 were employed. All of the dioxins and dibenzofurans detected

analyzed in this area were detected and not eliminated during the data evaluation, so they were grouped as described above (For a complete list of the dioxins and dibenzofurans, see page 6 of Table 2-1.). The frequency of detection was evaluated for the remaining chemicals on the list for the waste lagoon area. Chemicals deleted in less than 20% of the samples were deleted. Chemicals which were deleted based on frequency of detection are indicated by a (4) in Table 2-1. Some chemicals which may have been deleted in this step were retained according to best professional judgement. These chemicals are indicated by a (6) in Table 2-1. Essential nutrients were evaluated as described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.4 SITE-WIDE SOIL BORINGS

Site-wide soil borings were drilled and samples collected as described in the Phase I and II RI reports (WESTON, 1988; WWES, 1991a). This group includes all samples from the hand auger (HA) series, all samples from the BP series, all remaining samples from the ground water (GW) series (Phase II) and all remaining samples from the SS series (Phase I), excluding the background samples described below. The sample locations are shown in Figures 4 and 5. Table 2-3 denotes the chemicals of concern for remaining site-wide soils (complete data sets are included in the Phase II RI report; a summary is presented in Appendix A-2).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There was an additional qualifier attached to some of the Phase II data, which is not part of the CLP program but was defined by the laboratory performing the analysis. The qualifier was designated as an X and defined as "not meeting spectral matching requirements for positive identification." This indicates an uncertainty in the identity of the compound and, therefore, data with this qualifier were excluded.

There were 3 blank samples collected with the HA series, 4 blank samples collected with the BP series, and 10 blank samples collected with the GW series during the Phase II investigation. The sample concentrations in each series were compared with the concentrations detected in their respective blank samples, as described in Section 2.2.1.4, including the background samples described below. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. The TICs identified in the BP series were evaluated as described in Section 2.2.1.5.

Background soil samples which were used for comparison with site-wide soil borings included four Phase II samples (GW-35A, C, D, and E) and nine Phase I samples (SS11-01; SS12-01; SS13-01; SS14-01, 02, and DP; SS15-01, 02, and DP).

The Student "t" test was performed for all inorganic chemicals detected at least once in background data. If background data for an inorganic chemical were all below SQLs, a confidence interval was constructed based on foreground data with a 95 percent level of confidence and was compared to one half of the average SQL in background data.

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. Some inorganic chemicals which may have been deleted in this step (e.g., they were present at concentrations which were not significantly greater than background) were retained according to best professional judgement, as described in Section 2.2.1.6. These chemicals are indicated by a (3) in Table 2-1.

The remainder of the chemicals excluded from the risk assessment prior to comparison with background had been deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples in the site-wide soil borings and were deleted from the list of chemicals of concern for that area without statistical analysis. These chemicals are indicated by a (1) in Table 2-1.

Following the above data evaluation for the site-wide soil borings, the additional steps described in Section 2.2.1.7 were employed. Some of the dioxins and dibenzofurans analyzed in this area were detected and not eliminated during the data evaluation, so they were grouped as described in Section 2.2.1.7. The frequency of detection was evaluated for the remaining chemicals on the list for the site-wide soil borings. Chemicals which were deleted based on frequency of detection are indicated by a (4) in Table 2-1. Some chemicals which may have been deleted in this step were retained according to best professional judgment. These chemicals are indicated by a (6) in Table 2-1. Essential nutrients were evaluated as described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.5 GROUND WATER

Monitoring wells were drilled and ground water samples collected as described in the WWES, (1991a) and WESTON, (1988) Remedial Investigation reports. This group includes all samples from the WW series (WWES), GW series (WESTON), and the RW series (WWES and WESTON) except the background and RW samples described below.

The samples RW02, RW06, and RW10 from the Phase I RI report were not used based on the findings by WESTON (1988) that these wells had stagnant water and may not reflect actual ground water quality conditions. The sample locations are shown in Figure 4. Table 2-4 denotes the chemicals of concern for ground water (complete data sets are included in the Phase II RI report; a summary is presented in Appendix A-3).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There were no additional qualifiers attached to the data in this group that were not part of the CLP program.

There were 25 blank samples collected with the WW series and 1 blank sample collected with the RW series during the Phase II investigation. The chemical concentrations in each series were compared with the concentrations detected in their respective blank samples, as described in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. There were no TICs detected in any ground water samples.

Background concentrations in ground water were established separately for bedrock and unconsolidated wells. Background samples for bedrock wells included one Phase II sample (WW-35) and no Phase I samples. Background concentrations for unconsolidated wells included two Phase II samples (WW-23 and WW-36) and two Phase I samples (GW-23 (7/87) and GW-23 (8/86)). Background comparisons were not done for the residential wells (RW series) because it was not known which aquifer the wells were set in.

Because background data for bedrock wells consisted of only one sample, the Student "t" test was not an appropriate statistical test for comparison of background and foreground concentrations of inorganic chemicals. In this case, a confidence interval was constructed based on foreground data for bedrock wells with a 95 percent level of confidence and was compared to the actual background concentration for each chemical (or one half of the background SQL for chemicals which were not detected). The Student "t" test was performed for all chemicals in unconsolidated wells which had at least one detection in background data. If background data for a chemical were all below SQLs, a confidence interval was constructed based on foreground data with a 95 percent level of confidence and was compared to one half of the average SQL.

Inorganic chemicals which were not present at concentrations significantly higher than background for bedrock wells were deleted from the list of chemicals of concern for described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.6 CREEK SURFACE WATER

Surface water samples were collected as described in the Phase I and II RI reports (WESTON, 1988; WWES, 1991a). This group includes the samples SF1 through SF26, and SW01 through SW07, SW15, and SW17. The sample locations are shown in Figure 6. Tables 2-5 through 2-7 denote the chemicals of concern for surface water in Skinner Creek, Mill Creek, and Dump Creek, respectively (complete data sets are included in the Phase II RI report; summaries are presented in Appendices A-4, A-5, and A-6 for Mill Creek, Skinner Creek, and Dump Creek, respectively).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There were no additional qualifiers attached to the data which were not part of the CLP program.

There were 44 blank samples collected with the surface water (SF) series during the Phase II investigation. The blank samples were compared with all of the surface water samples with no regard to sample location. The sample concentrations were compared with the concentrations detected in the blank samples, as described in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. There were no TIC's detected in any surface water samples.

Background concentrations for surface water in creeks were divided into four groups: Skinner Creek, Dump Creek, Mill Creek above the confluence with Skinner Creek and Mill Creek below Skinner Creek. Background concentrations were established separately for each of these groups and subsequent statistical analyses were performed according to group. Results of these analyses are discussed in the following sections.

Following comparison with background for surface water, the additional steps described in Section 2.2.1.7 were employed. Dioxins and dibenzofurans were not analyzed for in surface water. The frequency of detection was evaluated individually for the remaining chemicals on the list for Skinner Creek, Dump Creek, and Mill Creek. No chemicals were deleted from any of the creeks in this step, however. Essential nutrients were evaluated as described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.6.1 SKINNER CREEK

The background sample established for Skinner Creek was taken upstream from the site (SF-26). Any concentrations of inorganic chemicals found in this sample were assumed to be background concentrations.

Because only one background sample was taken for Skinner Creek surface water, the Student "t" test was not an appropriate statistical test for comparison of background and foreground data. A confidence interval was constructed based on foreground data for Skinner Creek with a 95 percent level of confidence and was compared to the actual background concentration for each chemical (or one half of the background SQL for chemicals which were not detected).

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern in surface water for Skinner Creek without statistical analysis.

2.6.2 DUMP CREEK

The background sample established for Dump Creek was taken upstream from the site (SF-18). Any concentrations of inorganic chemicals found in this sample were assumed to be background concentrations.

Because only one background sample was taken for Dump Creek, the Student "t" test was not an appropriate statistical test for comparison of background and foreground data. A confidence interval was constructed based on foreground data for Dump Creek with a 95 percent level of confidence and was compared to the actual background concentration for each chemical (or one half of the background SQL for chemicals which were not detected).

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1, or were not detected in any foreground samples and were deleted from the list of chemicals of concern for surface water in Dump Creek without statistical analysis.

2.6.3 MILL CREEK

Four background samples were taken from Mill Creek upstream of the site (SF-12, SF-13, SF-14, and SF-15). In addition, three Phase I background samples were taken (SW04-01, SW05-01, and SW17-01). Concentrations of inorganic chemicals found in these samples were assumed to be background concentrations for Mill Creek above the confluence with Skinner Creek. Background samples from Mill Creek and Skinner Creek were combined to determine background concentrations for comparison with samples taken from Mill Creek below the confluence with Skinner Creek. The background sample from Dump Creek was not added because of its relatively small size in comparison to Mill Creek and Skinner Creek.

The Student "t" test was performed for all inorganic chemicals in Mill Creek (above and below Skinner) which were detected at least once in background data. If background data for a chemical were all below SQLs, a confidence interval was constructed based on foreground data with a 95 percent level of confidence and was compared to one half of the average SQL in background data.

The results of the Student "t" tests or confidence intervals for surface water above and below Skinner Creek were combined and interpreted for Mill Creek as a whole. Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals which were excluded from the risk assessment prior to comparison with background had been deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for Mill Creek without statistical analysis.

2.7 POND SURFACE WATER

Surface water samples were collected as described in the WWES, (1991a) and WESTON, (1988) Remedial Investigation reports. This group includes the samples SF27 through SF37, and SW09. The sample locations are shown in Figure 6. Tables 2-8 and 2-9 denote the chemicals of concern for surface water in Diving Pond and Trilobite Pond, respectively (complete data sets are included in the Phase II RI report; summaries are presented in Appendices A-7 and A-8).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There were no additional qualifiers attached to the data which were not part of the CLP program. Blank concentrations were evaluated as described above in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. There were no TIC's detected in any surface water samples.

2.7.1 Duck Pond

The surface water analyzed in Duck Pond (samples SF-27, SF-28 and SF-29) contained no organic chemicals; therefore, it was assumed that concentrations of inorganic chemicals found in Duck Pond were naturally occurring and were suitable for use as background concentrations for comparisons with the other ponds on site. Background concentrations established from Duck Pond for surface water in the ponds were compared separately to foreground concentrations found in Diving Pond and Trilobite Pond. The results of these comparisons are discussed in the following sections.

Following comparison with background for surface water, the additional steps were employed as described above in Section 2.2.1.7. Dioxins and dibenzofurans were not analyzed for in surface water. Frequency of detection was not evaluated for the remaining chemicals on the lists for surface water in the ponds because there were fewer than 20 samples. Essential nutrients were evaluated as described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.7.2 Diving Pond

The Student "t" test was performed to compare foreground data from Diving Pond to background data for all inorganic chemicals detected at least once in background data. If background data for a chemical were all below SQLs, confidence intervals were constructed based on foreground data with a 95 percent level of confidence and were compared separately to one half of the average SQL found in background data.

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for Diving Pond without statistical analysis.

2.7.3 TRILOBITE POND

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for Trilobite Pond without statistical analysis.

2.8 CREEK SEDIMENTS

Sediment samples were collected in the same locations as the surface water samples (as described in the Phase I and II RI reports WESTON, 1988; WWES, 1991a). This group includes the samples SM-1 through SM-26, and SD01 through SD07, SD15, SD16, and SD17. The sample locations are shown in Figure 6. Tables 2-10 through 2-12 denote the chemicals of concern in Skinner Creek, Dump Creek, and Mill Creek sediments, respectively (complete data sets are included in the Phase II RI report; summaries are presented in Appendices A-9, A-10, and A-11 for Mill Creek, Skinner Creek, and Dump Creek, respectively).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There were no additional qualifiers attached to the data which were not part of the CLP program.

There were 5 blank samples collected with the SM series during the WWES investigation. The sample concentrations were compared with the concentrations detected in the blank samples, as described in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. There were no TIC's detected in any sediment samples.

Background concentrations for sediments in creeks were divided into four groups: Skinner Creek, Dump Creek, Mill Creek above the confluence with Skinner Creek and Mill Creek below Skinner Creek. Background concentrations were established separately for each of these groups and subsequent statistical analyses were performed according to group. Results of these analysis are discussed in the following sections.

Following comparison with background for sediments, the additional steps described in Section 2.2.1.7 were employed. Dioxins and dibenzofurans were analyzed in some areas of concern (such as the buried lagoon) because past practices at the site suggested they may be present in those areas. Because there was no reason to believe they would be present in sediments, the chemicals were not analyzed for in sediments. The frequency of detection was evaluated for the remaining chemicals on the list for all sediments in each creek. No chemicals were deleted from any of the creeks in this step, however.

2.8.1 SKINNER CREEK

The background samples for Skinner Creek (SM-26 and SD16-01) were taken upstream of the site. Any concentrations of inorganic chemicals found in these samples were considered background concentrations.

The Student "t" test was performed for all inorganic chemicals in Skinner Creek which were detected at least once in background samples. If background data for a chemical were all below detection limits, a confidence interval was constructed based on foreground data for Skinner Creek with a 95 percent level of confidence and was compared to one half of the background SQL in background data.

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. Some inorganic chemicals which may have been deleted in this step (e.g., they were present at concentrations which were not significantly greater than background) were retained according to best professional judgement. These chemicals are indicated by a (3) in Table 2-1. The remainder of chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Skinner Creek without statistical analysis.

2.8.2 DUMP CREEK

The background sample established for Dump Creek was taken upstream from the site (SM-18).

Because only one background sample was taken for Dump Creek, the Student "t" test was not an appropriate statistical test for comparison of background and foreground data. A confidence interval was constructed based on foreground data for Dump Creek with a 95 percent level of confidence and was compared to the actual background concentration for each chemical (or one half of the background SQL for chemicals which were non-detect).

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. Some inorganic chemicals which may have been deleted in this step (e.g., they were present at concentrations which were not significantly greater than background) were retained according to best professional judgement. These chemicals are indicated by a (3) in Table 2-1.

The remainder of the chemicals excluded from the risk assessment prior to comparison with background had been deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Dump Creek without statistical analysis.

2.8.3 MILL CREEK

Four background samples were taken from Mill Creek upstream of the site (SM-12, SM-13, SM-14, and SM-15) and were background for Mill Creek. In addition, three Phase I samples were background samples (SD04-01, SD05-01, and SD17-01). Background samples from Mill Creek and Skinner Creek were combined to determine background concentrations for comparison with samples taken from Mill Creek below the confluence with Skinner Creek. The background sample from Dump Creek was not added because of its relatively small size in comparison to Mill Creek and Skinner Creek.

The Student "t" test was performed for all inorganic chemicals in Mill Creek (above and below Skinner Creek) which were detected at least once in background data. If background data for a chemical were all below SQLs, a confidence interval was constructed based on foreground data with a 95 percent level of confidence and was compared to one half of the average SQL in background data.

The results of the Student "t" tests or confidence intervals for sediments in Mill Creek above and below Skinner Creek were combined and interpreted for Mill Creek as a whole. Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals were excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Mill Creek without statistical analysis.

2.9 POND SEDIMENTS

Sediment samples were collected in the same locations as the surface water samples as described in the WWES, (1991a) and WESTON, (1988) Remedial Investigation reports. This group includes the samples SM-27 through SM-33, and SD09. The sample locations are shown in Figure 5. Tables 2-13 through 2-15 denote the chemicals of concern for Diving Pond, Trilobite Pond, and Duck Pond sediments, respectively (complete data sets are included in the Phase II RI report; summaries are presented in Appendices A-12, A-13, and A-14 for Duck Pond, Diving Pond, and Trilobite Pond, respectively).

Analytical methods, quantitation limits, and qualified data were evaluated as described in Section 2.2.1.1. There were no additional qualifiers attached to the data which were not part of the CLP program. Blank concentrations were evaluated as described above in Section 2.2.1.4. Chemicals deleted in this step are indicated by a (1)b in Table 2-1. There were no TIC's detected in any sediment samples.

Sediments analyzed in Duck Pond (SM-27, SM-28, and SM-29) were found to contain organic chemicals. It was assumed that the site was the source for these chemicals because of the proximity of the pond to the site. Because sediments in the pond were found to contain these chemicals, concentrations of inorganic chemicals in Duck Pond were not considered to be naturally occurring. Instead, background soil concentrations (see Section 2.3) were used to establish background for pond sediments. This was considered to be reasonable because each of the ponds (except Duck Pond) was originally excavated from soil. Duck Pond appears to have been created by blocking of natural drainage by the landfill, so the sediments in the pond were also originally soils.

The Student "t" test was performed to compare foreground data from each of the three ponds separately to background data for all inorganic chemicals which were detected at least once in background data. If background data for a chemical were all below SQLs, confidence intervals were constructed based on foreground data from each pond separately with a 95 percent level of confidence and were compared separately to one half of the average SQL found in background data. The results of this comparison are discussed in the following sections.

Following comparison with background for sediments, the additional steps were employed as described above in Section 2.9. Dioxins and dibenzofurans were analyzed for in some areas of concern (such as the buried lagoon) because past practices at the site suggested they may be present in these areas. Because there was no reason to believe they would be present in sediments, these chemicals were not analyzed for in sediments. Frequency of detection was not evaluated for the remaining chemicals on the lists for sediments in the ponds because the minimum requirement of 20 samples was not met. Essential nutrients were evaluated as described in Section 2.2.1.7. Chemicals deleted in this step are indicated by a (5) in Table 2-1.

2.9.1 DIVING POND

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. Some inorganic chemicals which may have been deleted in this step (e.g., they were present at concentrations which were not significantly greater than background) were retained according to best professional judgement. These chemicals are indicated by a (3) in Table 2-1.

The remainder of the chemicals excluded from the risk assessment prior to comparison with background concentrations were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Diving Pond without statistical analysis.

2.9.2 TRILOBITE POND

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Trilobite Pond without statistical analysis.

2.9.3 DUCK POND

Inorganic chemicals which were deleted based on comparison with background are indicated by a (2) in Table 2-1. The remainder of the chemicals excluded from the risk assessment prior to comparison with background were deleted in previous steps as described in Section 2.2.1 or were not detected in any foreground samples and were deleted from the list of chemicals of concern for sediments in Duck Pond without statistical analysis.

2.10 SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

The above data evaluation for all environmental areas at the site produced a list of chemicals of potential concern for each area of concern. Table 2-16 summarizes all the chemicals of concern and the range of detected concentrations in each area.

Tables

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Unconsolidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
Inorganics															
Aluminum	(2)	(2)	(2)		(1)b	(1)b	(2)	(1)b		(2)		(2)			
Antimony			(1)b	(1)b	(1)	(2)	(1)	(2)	(1)	(2)	(2)	(1)	(1)	(2)	(1)
Arsenic	(2)	(2)			(1)b	(1)b	(1)b	(1)b	(1)	(2)	(2)	(2)	(2)	(2)	(2)
Barium	(2)	(2)	(2)			(2)	(2)	(1)b		(2)	(2)	(2)		(2)	(2)
Beryllium	(2)	(2)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	(2)	(2)	
Cadmium			(3)	(3)	(2)	(2)	(2)		(2)	(2)	(2)	(2)	(1)	(2)	(1)
Calcium	(5)	(5)	(2)	(2)	(5)	(2)	(2)	(2)	(5)	(2)	(2)	(2)	(2)	(5)	(2)
Chromium	(2)		(2)		(2)	(1)	(1)	(1)	(1)	(2)	(2)	(2)			
Cobalt	(2)	(2)	(2)			(1)	(1)	(1)	(1)	(2)	(2)	(2)		(2)	
Copper	(2)	(3)			(1)b	(1)b	(2)	(1)b	(1)	(2)	(2)	(2)		(2)	
Iron	(2)				(2)		(2)	(2)		(2)	(2)	(2)	(2)		
Lead	(3)				(2)	(2)	(2)	(1)b	(1)b		(3)	(2)	(2)		(2)
Magnesium	(5)	(2)	(2)	(2)	(2)	(2)	(2)	(5)	(5)	(2)	(2)	(2)	(2)	(2)	(5)
Manganese	(2)	(2)			(2)		(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Mercury	(2)	(2)	(2)	(2)	(2)	(1)	(1)b	(1)b	(1)		(1)	(1)	(1)	(1)	(1)
Nickel	(2)	(2)	(2)			(2)	(2)		(1)	(2)	(2)	(2)		(2)	
Potassium	(2)	(2)	(2)	(5)	(5)	(2)	(2)	(2)	(5)	(2)	(2)	(2)	(5)	(5)	(5)
Selenium	(4)	(2)	(4)*	(4)*	(2)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)b	(1)	(1)b
Silver			(1)	(2)	(2)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)	(1)
Sodium	(2)	(2)	(2)		(2)	(2)		(2)		(2)	(2)	(2)	(2)	(2)	(2)
Thallium		(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	(2)		(1)	(1)
Tin	(3)	(4)	(1)	(1)	(1)	(1)b	(1)	(1)b	NA	(2)	(3)	(3)	NA	(3)	NA
Vanadium	(2)	(2)	(2)			(2)	(2)			(2)		(2)		(2)	
Zinc	(2)	(3)			(2)	(1)b	(2)	(1)b	(1)b	(2)	(2)	(2)	(2)		(2)
Cyanide	(3)	(3)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Volatiles															
Chloromethane	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Bromomethane	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Vinyl Chloride	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chloroethane	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Methylene Chloride					(1)b	(1)b	(1)b	(1)b	(1)	(1)b	(1)b		(1)b	(1)b	(1)b

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Unconsolidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
Acetone					(1)b	(1)b	(1)b	(1)b	(1)				(1)	(1)b	(1)
Carbon Disulfide	(1)	(1)	(4)*	(4)*		(1)	(1)	(1)	(1)		(1)b	(1)	(1)	(1)b	(1)
1,1-Dichloroethene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)
1,1-Dichloroethane	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-Dichloroethene	(4)	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)
Chloroform		(4)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-Dichloroethane		(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2-Butanone	(6)	(6)	(6)	(6)	(1)b	(1)b	(1)	(1)b	(1)	(1)	(1)	(1)	(1)		(1)
1,1,1-Trichloroethane		(4)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Carbon Tetrachloride		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Vinyl Acetate	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Bromodichloromethane	(1)	(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-Dichloropropane		(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
cis-1,3-Dichloropropene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Trichloroethene		(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)		(1)
Dibromochloromethane	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,1,2-Trichloroethane		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Benzene					(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)
trans-1,3-Dichloropropene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Bromoform	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4-Methyl-2-Pentanone	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)			(1)	(1)	(1)	(1)
2-Hexanone	(1)	(1)	(1)	(1)b	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)
Tetrachloroethene					(1)b	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,1,2,2-Tetrachloroethane		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)
Toluene					(1)b	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chlorobenzene	(6)	(6)			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ethylbenzene					(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)
Styrene	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Xylene (total)			(1)	(6)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)
Semi-Volatiles															
Phenol		(1)					(1)				(1)b	(1)	(1)	(1)b	(1)
bis(2-Chloroethyl)Ether		(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Unconsolidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
2-Chlorophenol	(1)	(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,3-Dichlorobenzene		(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,4-Dichlorobenzene		(1)			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Benzyl Alcohol		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2-Dichlorobenzene		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2-Methylphenol		(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
bis(2-Chloroisopropyl)Ether	(1)	(1)	(4)*	(4)*	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4-Methylphenol		(6)	(1)	(6)	(1)	(1)	(1)	(1)	(1)			(1)	(1)	(1)	(1)
N-Nitroso-Di-n-Propylamine	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Hexachloroethane		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Nitrobenzene	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)
Isophorone	(1)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)b	(1)	(1)	(1)	(1)
2-Nitrophenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2,4-Dimethylphenol	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Benzoic Acid		(4)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
bis(2-Chloroethoxy)Methane	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2,4-Dichlorophenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
1,2,4-Trichlorobenzene	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Naphthalene		(6)			(1)	(1)	(1)	(1)	(1)				(1)		(1)
4-Chloroaniline	(1)	(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4-Chloro-3-Methylphenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2-Methylnaphthalene		(6)	(1)	(6)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
2,4,6-Trichlorophenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2,4,5-Trichlorophenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2-Chloronaphthalene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
2-Nitroaniline	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Dimethyl Phthalate		(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)	(1)
Acenaphthylene		(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)
2,6-Dinitrotoluene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
3-Nitroaniline	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Acenaphthene		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)			(1)	(1)		(1)

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Uncon-solidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
2,4-Dinitrophenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4-Nitrophenol	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Dibenzofuran		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
2,4-Dinitrotoluene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Diethylphthalate	(1)	(6)	(4)*	(4)*			(1)	(1)				(1)	(1)	(1)	(1)
4-Chlorophenyl-phenylether	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Fluorene		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
4-Nitroaniline	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4,6-Dinitro-2-Methylphenol	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
N-Nitrosodiphenylamine	(1)	(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)b
4-Bromophenyl-phenylether	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Pentachlorophenol	(1)	(1)			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Phenanthrene			(4)*	(4)*	(1)	(1)	(1)	(1)	(1)				(1)		(1)
Anthracene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
Di-n-Butylphthalate						(1)	(1)	(1)	(1)	(1)			(1)	(1)	(1)
Fluoranthene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
Pyrene			(1)	(1)	(1)	(1)		(1)	(1)				(1)		(1)
Butylbenzylphthalate			(4)*	(4)*	(1)		(1)	(1)	(1)	(1)b	(1)	(1)	(1)	(1)	(1)
3,3'-Dichlorobenzidine	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Benzo(a)Anthracene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
Chrysene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
bis(2-Ethylhexyl)Phthalate							(1)b		(1)		(1)b				
Di-n-Octyl Phthalate		(6)	(1)	(1)			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Benzo(b)Fluoranthene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)		(1)
Benzo(k)Fluoranthene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
Benzo(a)Pyrene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
Indeno(1,2,3-cd)Pyrene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
Dibenzo(a,h)Anthracene	(4)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)
Benzo(g,h,i)Perylene			(1)	(1)	(1)	(1)	(1)	(1)	(1)				(1)	(1)	(1)
Pesticides															
alpha-BHC	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
beta-BHC	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Unconsolidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
delta-BHC	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
gamma-BHC (Lindane)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heptachlor		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aldrin	(6)	(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Heptachlor epoxide	(1)	(1)	(7)	(7)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Endosulfan I	(1)	(1)	(7)	(7)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Dieldrin	(6)	(1)	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4,4'-DDE	(1)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Endrin	(1)		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Endosulfan II	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4,4'-DDD	(6)		(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)
Endosulfan sulfate	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
4,4'-DDT	(6)		(6)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Methoxychlor	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Endrin ketone		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
alpha-Chlordane	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)
gamma-Chlordane		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Toxaphene	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1016	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1221	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1232	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1242	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1248	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aroclor-1254	(1)		(6)	(6)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)		(1)
Aroclor-1260	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)		(1)
Alternate Pesticides															
Hexachlorobenzene			(1)		(1)	(1)	(1)		(1)			(1)			(1)
Hexachlorocylopentadiene		(1)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)
Hexachlorobutadiene		(6)	(6)	(6)	(1)	(1)	(1)			(6)			(1)		(1)
Octachlorocyclopentene		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(1)	(1)
Heptachloronorborene					(1)b	(1)b	(1)	(1)b	(1)b	(1)		(1)			
Chlordene		(4)	(4)*	(4)*	(1)	(1)	(1)	(1)	(1)			(1)		(1)	(1)

TABLE 2-1
SUMMARY OF REASONS FOR DELETION

Chemical	Soils		Ground Water		Surface Water					Sediments					
	Waste Lagoon	Site-Wide	Bedrock	Unconsolidated	Mill Creek	Skinner Creek	Dump Creek	Diving Pond	Trilobite Pond	Mill Creek	Skinner Creek	Dump Creek	Duck Pond	Diving Pond	Trilobite Pond
Dioxins and Dibenzofurans															
2,3,7,8-TCDD	(6)	(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TETRA CDD	(6)	(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PENTA CDD		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HEXA CDD		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HEPTA CDD			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCTA CDD	(6)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	(6)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total TETRA CDF			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PENTA CDF		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HEXA CDF		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total HEPTA CDF		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCTA CDD		(1)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Shaded spaces indicate that the chemical is of concern for that area.

(See Section 2 for details on data evaluation)

(1) This chemical was deleted from the list for this area before the Background comparison (see sections 2.2 through 2.10 for details).

(1)b This chemical was deleted from the list for this area because of detection in blank samples (see sections 2.2 through 2.10 for details).

(2) *This chemical was deleted from the list for this area based on a comparison with background.*

(3) This chemical was re-added to the list for this area, following the background comparison, based on best professional judgement.

(4) This chemical was deleted from the list for this area based on its frequency of detection.

(5) This chemical was deleted from the list because it is an essential nutrient, present at only low concentrations at the site (see Section 2.2.1.7).

(6) This chemical was added to the list following all data evaluation steps based on best professional judgement.

(7) This chemical was deleted from the list based on best professional judgement (see section 2 for a more detailed explanation).

* A combined frequency of detection was used for ground water based on the data from bedrock wells, unconsolidated wells and residential wells.

NA - This chemical was not analyzed for in this area.

TABLE 2-2
SUMMARY OF CHEMICALS OF CONCERN IN WASTE LAGOON AREA
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Antimony	15 / 64	23.4%	3.4 - 23	- - -
Cadmium	6 / 64	9.4%	1.1 - 56.9	- - -
Lead	50 / 64	78.1%	6.7 - 4360	10.7 - 42
Silver	9 / 62	14.5%	0.72 - 13	- - -
Thallium	10 / 62	16.1%	0.24 - 1	- - -
Tin	2 / 2	100.%	155 - 408	- - -
Cyanide	4 / 64	6.3%	2.6 - 43.6	- - -
Methylene Chloride	7 / 67	10.4%	0.0064 - 5.3	0.0019 - 0.0019
Acetone	10 / 67	14.9%	0.014 - 140	- - -
Chloroform	5 / 65	7.7%	0.02 - 33	- - -
1,2-Dichloroethane	16 / 65	24.6%	0.003 - 210	- - -
2-Butanone	3 / 67	4.5%	0.24 - 39	- - -
1,1,1-Trichloroethane	4 / 67	6.%	0.026 - 63	0.009 - 0.025
Carbon Tetrachloride	4 / 65	6.2%	0.041 - 160	- - -
1,2-Dichloropropane	15 / 65	23.1%	0.14 - 340	- - -
Trichloroethene	9 / 65	13.8%	0.006 - 140	- - -
1,1,2-Trichloroethane	17 / 65	26.2%	0.073 - 370	- - -
Benzene	13 / 67	19.4%	0.007 - 60	- - -
trachloroethene	8 / 67	11.9%	0.049 - 44	- - -
1,1,2,2-Tetrachloroethane	6 / 65	9.2%	0.04 - 130	- - -
Toluene	50 / 67	74.6%	0.001 - 31000	0.012 - 2.5
Chlorobenzene	3 / 65	4.6%	5 - 15	- - -
Ethylbenzene	29 / 65	44.6%	0.0008 - 98	- - -
Xylene (total)	33 / 65	50.8%	0.001 - 200	- - -
Phenol	13 / 72	18.1%	0.48 - 26	- - -
bis(2-Chloroethyl)Ether	8 / 72	11.1%	0.22 - 21	- - -
1,3-Dichlorobenzene	12 / 72	16.7%	0.043 - 230	- - -
1,4-Dichlorobenzene	11 / 72	15.3%	0.13 - 180	- - -
Benzyl Alcohol	7 / 72	9.7%	0.94 - 9.2	- - -
1,2-Dichlorobenzene	9 / 72	12.5%	0.43 - 94	- - -
2-Methylphenol	9 / 72	12.5%	0.17 - 7.8	- - -
4-Methylphenol	9 / 72	12.5%	0.57 - 26	- - -
Hexachloroethane	4 / 72	5.6%	0.69 - 19	- - -
Benzoic Acid	19 / 72	26.4%	1.6 - 1100	- - -
Naphthalene	33 / 72	45.8%	0.11 - 610	- - -
2-Methylnaphthalene	31 / 72	43.1%	0.036 - 220	- - -
Dimethyl Phthalate	5 / 72	6.9%	0.12 - 67	- - -
Acenaphthylene	6 / 73	8.2%	1 - 41	- - -
Acenaphthene	11 / 72	15.3%	0.035 - 7.9	- - -
Dibenzofuran	8 / 72	11.1%	0.079 - 7	- - -
Fluorene	14 / 72	19.4%	0.067 - 34	- - -
henanthrene	28 / 73	38.4%	0.058 - 110	0.05 - 0.21
nthracene	9 / 73	12.3%	0.19 - 84	- - -
Di-n-Butylphthalate	12 / 73	16.4%	0.052 - 15	0.073 - 0.073

TABLE 2-2
SUMMARY OF CHEMICALS OF CONCERN IN WASTE LAGOON AREA
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Fluoranthene	18 / 73	–24.7%	0.049 - 31	0.06 - 0.39
Pyrene	16 / 73	–21.9%	0.12 - 48	0.07 - 0.45
Butylbenzylphthalate	13 / 73	17.8%	0.063 - 25	- - -
Benzo(a)Anthracene	10 / 73	13.7%	0.43 - 15	0.04 - 0.25
Chrysene	10 / 73	13.7%	0.56 - 17	0.06 - 0.33
bis(2-Ethylhexyl)Phthalate	23 / 73	–31.5%	0.053 - 150	0.091 - 0.091
Di-n-Octyl Phthalate	5 / 73	6.8%	3.9 - 10	- - -
Benzo(b)Fluoranthene	8 / 73	11.%	0.55 - 7	0.1 - 0.6
Benzo(k)Fluoranthene	7 / 73	9.6%	0.29 - 5	- - -
Benzo(a)Pyrene	8 / 72	11.1%	0.38 - 10	- - -
Indeno(1,2,3-cd)Pyrene	6 / 72	8.3%	0.2 - 3.4	0.12 - 0.37
Benzo(g,h,i)Perylene	5 / 73	6.8%	0.16 - 4.1	0.51 - 0.51
beta-BHC	2 / 66	3.%	0.0077 - 0.0096	- - -
Heptachlor	15 / 66	–22.7%	0.0082 - 52	- - -
Aldrin	3 / 66	4.5%	0.64 - 11	- - -
Dieldrin	2 / 66	3.%	1.7 - 1.9	- - -
4,4'-DDD	1 / 66	1.5%	0.079 - 0.079	- - -
4,4'-DDT	1 / 66	1.5%	0.055 - 0.055	- - -
ıdrin ketone	7 / 66	10.6%	0.045 - 84	- - -
gamma-Chlordane	5 / 66	7.6%	1.8 - 44	- - -
Aroclor-1248	2 / 66	3.%	0.55 - 0.78	- - -
Aroclor-1260	2 / 66	3.%	0.46 - 1.2	- - -
Hexachlorobenzene	87 / 157	–55.4%	0.00093 - 1800	0.000225 - 0.0038
Hexachlorocylopentadiene	27 / 158	17.1%	0.17 - 4300	0.0175 - 0.355
Hexachlorobutadiene	42 / 156	– 26.9%	0.0012 - 260	0.00055 - 0.035
Octachlorocyclopentene	23 / 76	–30.3%	0.83 - 23000	0.00405 - 0.013
Heptachloronorborene	47 / 83	–56.6%	0.0015 - 2500	0.0017 - 0.019
Chlordene	49 / 82	–59.8%	0.0011 - 1200	0.000485 - 0.0016
2,3,7,8-TCDD	2 / 63	3.2%	0.0000276 - 0.0000294	- - -
Total TETRA CDD	3 / 63	4.8%	0.0000276 - 0.0001402	- - -
Total PENTA CDD	6 / 63	9.5%	0.0000008 - 0.0001727	- - -
Total HEXA CDD	4 / 63	6.3%	0.0000196 - 0.0001891	- - -
Total HEPTA CDD	4 / 63	6.3%	0.000105 - 0.000309	- - -
Total OCTA CDD	1 / 63	1.6%	0.003165 - 0.003165	- - -
2,3,7,8-TCDF	3 / 62	4.8%	0.0000096 - 0.000022	- - -
Total TETRA CDF	12 / 62	19.4%	0.0000074 - 0.0023047	- - -
Total PENTA CDF	10 / 63	15.9%	0.0000103 - 0.0021574	- - -
Total HEXA CDF	6 / 63	9.5%	0.0000717 - 0.0054693	- - -
Total HEPTA CDF	8 / 62	12.9%	0.000104 - 0.003731	- - -
Total OCTA CDF	8 / 63	12.7%	0.000019 - 0.015109	- - -

:Not Detected

TABLE 2-3
SUMMARY OF CHEMICALS OF CONCERN IN SITE-WIDE SOILS
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Antimony	9 / 46	19.6%	4.9 - 14.9	- - -
Cadmium	7 / 46	15.2%	0.54 - 11	- - -
Chromium	44 / 46	95.7%	6.7 - 97	11 - 17
Copper	34 / 46	73.9%	12 - 574	16 - 24
Lead	46 / 46	100.%	3.7 - 1030	10.7 - 42
Silver	9 / 46	19.6%	0.54 - 4.3	- - -
Zinc	45 / 46	97.8%	36.2 - 10200	42.8 - 116
Cyanide	3 / 46	6.5%	0.84 - 1.8	- - -
Methylene Chloride	10 / 47	21.3%	0.0014 - 7.9	0.0019 - 0.0019
Acetone	9 / 47	19.1%	0.0089 - 34	- - -
2-Butanone	2 / 47	4.3%	0.031 - 0.045	- - -
Benzene	4 / 47	8.5%	0.00049 - 0.0022	- - -
Tetrachloroethene	6 / 47	12.8%	0.0021 - 2.7	- - -
Toluene	16 / 47	34.%	0.001 - 0.36	0.012 - 2.5
Chlorobenzene	1 / 47	2.1%	0.002 - 0.002	- - -
Ethylbenzene	4 / 47	8.5%	0.001 - 0.002	- - -
Xylene (total)	10 / 47	21.3%	0.001 - 0.016	- - -
4-Methylphenol	2 / 45	4.4%	0.11 - 0.14	- - -
Naphthalene	1 / 45	2.2%	0.22 - 0.22	- - -
2-Methylnaphthalene	1 / 45	2.2%	0.064 - 0.064	- - -
Diethylphthalate	1 / 45	2.2%	0.078 - 0.078	- - -
Phenanthrene	11 / 45	24.4%	0.085 - 4.2	0.05 - 0.21
Anthracene	3 / 45	6.7%	0.092 - 0.34	- - -
Di-n-Butylphthalate	8 / 45	17.8%	0.055 - 0.49	0.073 - 0.073
Fluoranthene	15 / 45	33.3%	0.12 - 7.9	0.06 - 0.39
Pyrene	15 / 45	33.3%	0.13 - 8.5	0.07 - 0.45
Butylbenzylphthalate	4 / 45	8.9%	0.43 - 7	- - -
Benzo(a)Anthracene	11 / 45	24.4%	0.069 - 4.34	0.04 - 0.25
Chrysene	15 / 45	33.3%	0.06 - 5.56	0.06 - 0.33
bis(2-Ethylhexyl)Phthalate	16 / 45	35.6%	0.045 - 12	0.091 - 0.091
Di-n-Octyl Phthalate	2 / 45	4.4%	0.07 - 0.96	- - -
Benzo(b)Fluoranthene	8 / 45	17.8%	0.22 - 6.17	0.1 - 0.6
Benzo(k)Fluoranthene	5 / 45	11.1%	0.05 - 0.76	- - -
Benzo(a)Pyrene	6 / 45	13.3%	0.062 - 5.6	- - -
Indeno(1,2,3-cd)Pyrene	5 / 45	11.1%	0.29 - 1.5	0.12 - 0.37
Benzo(g,h,i)Perylene	5 / 45	11.1%	0.31 - 1.7	0.51 - 0.51
4,4'-DDE	1 / 29	3.4%	0.044 - 0.044	- - -
Endrin	2 / 29	6.9%	0.61 - 0.65	- - -
4,4'-DDD	2 / 29	6.9%	0.01 - 0.11	- - -
4,4'-DDT	2 / 29	6.9%	0.013 - 0.097	- - -
Aroclor-1254	7 / 29	24.1%	0.14 - 980	- - -
Hexachlorobenzene	6 / 71	8.5%	0.073 - 23	0.0038 - 0.0038
Hexachlorobutadiene	2 / 71	2.8%	0.0017 - 0.0041	0.0066 - 0.035

TABLE 2-3

SUMMARY OF CHEMICALS OF CONCERN IN SITE-WIDE SOILS

Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Heptachloronorborene	3 / 26	11.5%	0.0011 - 0.0027	0.0017 - 0.019
Total HEPTA CDD	2 / 8	25.%	0.000001 - 0.000205	- - -
Total OCTA CDD	1 / 8	12.5%	0.000192 - 0.000192	- - -
2,3,7,8-TCDF	1 / 8	12.5%	0.000008 - 0.000008	- - -
Total TETRA CDF	1 / 8	12.5%	0.000008 - 0.000008	- - -

- - - Not Detected

TABLE 2-4
SUMMARY OF CHEMICALS OF CONCERN IN GROUND WATER

Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	30 / 94	31.9%	0.017 - 55.6	0.034 - 0.034
Arsenic	25 / 89	28.1%	0.002 - 0.0612	- - -
Barium	83 / 94	88.3%	0.003 - 5.95	0.03 - 0.626
Cadmium	6 / 42	14.3%	0.00053 - 0.064	- - -
Chromium	27 / 94	28.7%	0.004 - 0.137	0.01 - 0.01
Cobalt	17 / 86	19.8%	0.003 - 0.31	0.0061 - 0.0061
Copper	52 / 94	55.3%	0.002 - 0.163	0.0042 - 0.013
Lead	23 / 89	25.8%	0.00282 - 0.54	- - -
Manganese	85 / 94	90.4%	0.0104 - 18	0.021 - 0.712
Nickel	26 / 89	29.2%	0.009 - 0.41	0.01 - 0.01
Vanadium	25 / 83	30.1%	0.0021 - 0.135	0.0057 - 0.0124
Zinc	52 / 94	55.3%	0.001 - 1.33	0.016 - 0.016
Cyanide	2 / 89	2.2%	0.011 - 0.0235	- - -
Vinyl Chloride	4 / 69	5.8%	0.004 - 0.048	- - -
Chloroethane	5 / 69	7.2%	0.017 - 0.052	- - -
Methylene Chloride	7 / 94	7.4%	0.003 - 0.014	- - -
Acetone	13 / 89	14.6%	0.002 - 5.9	- - -
1,1-Dichloroethane	4 / 69	5.8%	0.001 - 0.082	- - -
1,2-Dichloroethene	8 / 89	9.%	0.005 - 4.5	- - -
Chloroform	4 / 74	5.4%	0.001 - 0.085	- - -
1,2-Dichloroethane	7 / 53	13.2%	0.005 - 0.18	- - -
2-Butanone	3 / 89	3.4%	0.006 - 0.036	- - -
1,1,1-Trichloroethane	3 / 89	3.4%	0.0026 - 0.012	- - -
Carbon Tetrachloride	2 / 80	2.5%	0.003 - 0.0067	- - -
1,2-Dichloropropane	3 / 33	9.1%	0.021 - 0.37	- - -
Trichloroethene	2 / 33	6.1%	0.002 - 0.071	- - -
1,1,2-Trichloroethane	1 / 33	3.%	0.055 - 0.055	- - -
Benzene	17 / 89	19.1%	0.001 - 20	- - -
Tetrachloroethene	5 / 89	5.6%	0.001 - 0.02	- - -
1,1,2,2-Tetrachloroethane	1 / 33	3.%	0.006 - 0.006	- - -
Toluene	9 / 94	9.6%	0.0013 - 3.1	- - -
Chlorobenzene	6 / 89	6.7%	0.001 - 0.027	- - -
Ethylbenzene	6 / 89	6.7%	0.005 - 0.08	- - -
Xylene (total)	3 / 89	3.4%	0.034 - 0.18	- - -
Phenol	6 / 88	6.8%	0.002 - 0.67	- - -
bis(2-Chloroethyl)Ether	9 / 83	10.8%	0.001 - 0.24	- - -
1,4-Dichlorobenzene	6 / 83	7.2%	0.0035 - 0.011	- - -
Benzyl Alcohol	1 / 53	1.9%	0.001 - 0.001	- - -
1,2-Dichlorobenzene	1 / 33	3.%	0.006 - 0.006	- - -
2-Methylphenol	1 / 53	1.9%	0.45 - 0.45	- - -
4-Methylphenol	2 / 88	2.3%	0.14 - 0.35	- - -
Naphthalene	11 / 83	13.3%	0.00073 - 0.064	- - -
2-Methylnaphthalene	1 / 63	1.6%	0.003 - 0.003	- - -
Pentachlorophenol	6 / 63	9.5%	0.015 - 0.26	- - -

TABLE 2-4
SUMMARY OF CHEMICALS OF CONCERN IN GROUND WATER
Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Di-n-Butylphthalate	7 / 83	8.4%	0.00061 - 0.003	- - -
bis(2-Ethylhexyl)Phthalate	7 / 83	8.4%	0.001 - 0.012	- - -
Aldrin	1 / 54	1.9%	0.0005 - 0.0005	- - -
Dieldrin	1 / 65	1.5%	0.00013 - 0.00013	- - -
4,4'-DDT	2 / 59	3.4%	0.00006 - 0.00009	- - -
Aroclor-1254	2 / 59	3.4%	0.0002 - 0.0002	- - -
Hexachlorobenzene	10 / 116	8.6%	0.00002 - 0.00024	- - -
Hexachlorobutadiene	3 / 104	2.9%	0.000015 - 0.000087	- - -
Heptachloronorborene	3 / 52	5.8%	0.000052 - 0.00011	- - -

- - - Not Detected

TABLE 2-5
SUMMARY OF CHEMICALS OF CONCERN IN SKINNER CREEK SURFACE WATER
Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Manganese	8 / 11	72.7%	0.0163 - 0.0715	0.0094 - 0.0094
Phenol	1 / 11	9.1%	0.003 - 0.003	---
Diethylphthalate	2 / 8	25.%	0.001 - 0.003	---
Butylbenzylphthalate	1 / 11	9.1%	0.003 - 0.003	---
bis(2-Ethylhexyl)Phthalate	1 / 11	9.1%	0.1319 - 0.1319	---
Di-n-Octyl Phthalate	1 / 11	9.1%	0.0036 - 0.0036	---

--- Not Detected

TABLE 2-6
SUMMARY OF CHEMICALS OF CONCERN IN MILL CREEK SURFACE WATER

Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Barium	12 / 15	80.0%	0.0412 - 0.0683	0.0324 - 0.044
Cobalt	1 / 12	8.3%	0.0056 - 0.0056	- - -
Nickel	1 / 15	6.7%	0.0078 - 0.0078	- - -
Vanadium	1 / 12	8.3%	0.0098 - 0.0098	- - -
Carbon Disulfide	1 / 16	6.3%	0.0003 - 0.0003	- - -
Xylene (total)	1 / 13	7.7%	0.003 - 0.003	- - -
Phenol	3 / 16	18.8%	0.0006 - 0.0089	0.0000005 - 0.0000032
Diethylphthalate	2 / 13	15.4%	0.002 - 0.004	- - -
Di-n-Butylphthalate	7 / 16	43.8%	0.0001 - 0.01	0.0001 - 0.013
bis(2-Ethylhexyl)Phthalate	1 / 16	6.3%	0.0816 - 0.0816	- - -
Di-n-Octyl Phthalate	1 / 16	6.3%	0.0043 - 0.0043	- - -

- - - Not Detected

TABLE 2-7

SUMMARY OF CHEMICALS OF CONCERN IN DUMP CREEK SURFACE WATER

Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
bis(2-Chloroisopropyl)Ether	1 / 3	33.3%	0.003 - 0.003	- - -
Pyrene	1 / 3	33.3%	0.001 - 0.001	- - -

- - - Not Detected

TABLE 2-8

SUMMARY OF CHEMICALS OF CONCERN IN DIVING POND SURFACE WATER

Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Cadmium	4 / 4	100.%	0.0037 - 0.0058	- - -
Nickel	4 / 5	80.%	0.0059 - 0.0084	- - -
Vanadium	4 / 4	100.%	0.0072 - 0.0099	- - -
Phenol	1 / 5	20.%	0.0022 - 0.0022	- - -
bis(2-Ethylhexyl)Phthalate	1 / 5	20.%	0.0409 - 0.0409	- - -
Hexachlorobenzene	1 / 8	12.5%	0.000033 - 0.000033	- - -
Hexachlorobutadiene	1 / 8	12.5%	0.000008 - 0.000008	- - -

- - - Not Detected

TABLE 2-9

SUMMARY OF CHEMICALS OF CONCERN IN TRILOBITE POND SURFACE WATER

Units in mg/L

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	6 / 6	100.0%	1.02 - 4.61	0.758 - 0.758
Barium	6 / 6	100.0%	0.0311 - 0.0438	- - -
Vanadium	5 / 6	83.3%	0.006 - 0.0104	- - -
Phenol	1 / 6	16.7%	0.001 - 0.001	- - -
Dimethyl Phthalate	1 / 6	16.7%	0.001 - 0.001	- - -
Diethylphthalate	2 / 6	33.3%	0.001 - 0.002	- - -
Hexachlorobutadiene	3 / 12	25.%	0.0000029 - 0.000011	- - -

- - - Not Detected

TABLE 2-10

SUMMARY OF CHEMICALS OF CONCERN IN SKINNER CREEK SEDIMENTS

Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	10 / 10	100.%	8860 - 15900	8070 - 9040
Lead	10 / 10	100.%	21 - 139	30.2 - 32
Tin	2 / 3	66.7%	40 - 52	- - -
Vanadium	9 / 10	90.%	18 - 32.3	20 - 20.5
Acetone	2 / 10	20.%	0.023 - 0.062	- - -
1,2-Dichloroethene	1 / 7	14.3%	0.083 - 0.083	- - -
Trichloroethene	1 / 10	10.%	0.02 - 0.02	- - -
4-Methyl-2-Pentanone	1 / 10	10.%	0.0049 - 0.0049	- - -
2-Hexanone	1 / 10	10.%	0.0051 - 0.0051	- - -
1,1,2,2-Tetrachloroethane	1 / 10	10.%	0.002 - 0.002	- - -
4-Methylphenol	3 / 10	30.%	0.0105 - 0.0191	- - -
Nitrobenzene	1 / 10	10.%	0.0042 - 0.0042	- - -
Naphthalene	2 / 10	20.%	0.0166 - 0.0648	- - -
2-Methylnaphthalene	2 / 10	20.%	0.0235 - 0.1007	- - -
Acenaphthene	1 / 10	10.%	0.14 - 0.14	- - -
Dibenzofuran	3 / 10	30.%	0.0073 - 0.13	- - -
Diethylphthalate	3 / 10	30.%	0.021 - 0.0283	- - -
Fluorene	3 / 10	30.%	0.008 - 0.22	- - -
Phenanthrene	5 / 10	50.%	0.0151 - 1.8	0.3 - 0.3
Anthracene	3 / 10	30.%	0.014 - 0.31	0.12 - 0.12
Di-n-Butylphthalate	5 / 7	71.4%	0.073 - 0.16	- - -
Fluoranthene	8 / 10	80.%	0.0313 - 2.5	1 - 1
Pyrene	8 / 10	80.%	0.0217 - 1.5	0.73 - 0.73
Benzo(a)Anthracene	4 / 10	40.%	0.0876 - 0.68	0.46 - 0.46
Chrysene	6 / 10	60.%	0.056 - 0.69	0.43 - 0.43
Benzo(b)Fluoranthene	5 / 10	50.%	0.0116 - 0.51	0.37 - 0.37
Benzo(k)Fluoranthene	5 / 10	50.%	0.0146 - 0.51	0.35 - 0.35
Benzo(a)Pyrene	4 / 10	40.%	0.0084 - 0.33	0.28 - 0.28
Indeno(1,2,3-cd)Pyrene	2 / 10	20.%	0.0394 - 0.26	0.19 - 0.19
Benzo(g,h,i)Perylene	3 / 10	30.%	0.048 - 0.21	- - -
Aroclor-1260	2 / 9	22.2%	0.01143 - 0.02985	- - -
Hexachlorobenzene	2 / 14	14.3%	0.003 - 0.003	- - -
Hexachlorocylopentadiene	3 / 14	21.4%	0.052 - 0.067	- - -
Hexachlorobutadiene	6 / 14	42.9%	0.0021 - 0.027	0.0067 - 0.0067
Heptachloronorborene	3 / 7	42.9%	0.0012 - 0.029	0.0014 - 0.0014
Chlordene	4 / 7	57.1%	0.0013 - 0.0049	- - -

- - - Not Detected

TABLE 2-11

SUMMARY OF CHEMICALS OF CONCERN IN DUMP CREEK SEDIMENTS

Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Tin	1 / 2	50.%	37 - 37	- - -
Methylene Chloride	1 / 5	20.%	0.968 - 0.968	- - -
Acetone	3 / 5	60.%	0.074 - 0.31	0.023 - 0.023
Naphthalene	1 / 5	20.%	0.18 - 0.18	- - -
2-Methylnaphthalene	2 / 5	40.%	0.12 - 0.16	- - -
Dibenzofuran	1 / 5	20.%	0.15 - 0.15	- - -
Fluorene	1 / 5	20.%	0.22 - 0.22	- - -
Phenanthrene	3 / 5	60.%	0.152 - 2	- - -
Anthracene	1 / 5	20.%	0.51 - 0.51	- - -
Di-n-Butylphthalate	1 / 3	33.3%	0.071 - 0.071	- - -
Fluoranthene	4 / 5	80.%	0.13 - 1.9	- - -
Pyrene	4 / 5	80.%	0.134 - 1.9	- - -
Benzo(a)Anthracene	2 / 5	40.%	0.124 - 0.83	- - -
Chrysene	3 / 5	60.%	0.12 - 0.88	- - -
bis(2-Ethylhexyl)Phthalate	3 / 5	60.%	0.033 - 0.57	- - -
Benzo(b)Fluoranthene	4 / 5	80.%	0.103 - 1.1	- - -
Benzo(k)Fluoranthene	3 / 5	60.%	0.079 - 0.16	- - -
Benzo(a)Pyrene	3 / 5	60.%	0.125 - 0.74	- - -
Indeno(1,2,3-cd)Pyrene	1 / 5	20.%	0.059 - 0.059	- - -
Benzo(g,h,i)Perylene	1 / 5	20.%	0.055 - 0.055	- - -
Hexachlorobutadiene	1 / 6	16.7%	0.0025 - 0.0025	- - -

- - - Not Detected

TABLE 2-12
SUMMARY OF CHEMICALS OF CONCERN IN MILL CREEK SEDIMENTS
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Lead	16 / 16	100.%	10 - 43	7 - 18.3
Mercury	8 / 12	66.7%	0.12 - 0.13	- - -
Acetone	2 / 16	12.5%	0.007 - 0.016	0.036 - 0.11
Carbon Disulfide	3 / 16	18.8%	0.0009 - 0.0014	0.0004 - 0.0004
4-Methyl-2-Pentanone	3 / 16	18.8%	0.0013 - 0.0016	0.0011 - 0.0011
Phenol	4 / 17	23.5%	0.055 - 0.1397	0.0456 - 0.0456
4-Methylphenol	4 / 17	23.5%	0.0165 - 1.5542	0.0147 - 0.2765
Naphthalene	2 / 17	11.8%	0.022 - 0.38	0.0129 - 0.0129
2-Methylnaphthalene	4 / 17	23.5%	0.002 - 0.045	0.0087 - 0.0087
Acenaphthylene	3 / 17	17.6%	0.0184 - 0.12	- - -
Acenaphthene	1 / 17	5.9%	0.4 - 0.4	0.0513 - 0.0513
Dibenzofuran	3 / 17	17.6%	0.042 - 0.28	0.0251 - 0.0251
Diethylphthalate	4 / 17	23.5%	0.0335 - 0.0517	0.0281 - 0.0291
Fluorene	8 / 17	47.1%	0.0271 - 0.39	0.0544 - 0.0544
Phenanthrene	14 / 17	82.4%	0.0905 - 2.9	0.1 - 0.4439
Anthracene	10 / 17	58.8%	0.047 - 0.58	0.0903 - 0.0903
Fluoranthene	16 / 17	94.1%	0.11 - 3.3	0.12 - 0.6068
Pyrene	14 / 17	82.4%	0.089 - 3.2	0.13 - 0.4613
Benzo(a)Anthracene	14 / 17	82.4%	0.0476 - 1.6	0.093 - 0.2552
Chrysene	13 / 17	76.5%	0.0602 - 1.9	0.089 - 0.2764
bis(2-Ethylhexyl)Phthalate	7 / 17	41.2%	0.043 - 0.18	0.23 - 0.23
Benzo(b)Fluoranthene	15 / 17	88.2%	0.0366 - 1.7	0.11 - 0.2269
Benzo(k)Fluoranthene	13 / 17	76.5%	0.0375 - 1.2	0.1794 - 0.1794
Benzo(a)Pyrene	12 / 17	70.6%	0.069 - 1.4	0.4644 - 0.4644
Indeno(1,2,3-cd)Pyrene	10 / 17	58.8%	0.099 - 0.61	0.1244 - 0.1244
Dibenzo(a,h)Anthracene	3 / 17	17.6%	0.055 - 0.13	0.0327 - 0.0327
Benzo(g,h,i)Perylene	11 / 17	64.7%	0.078 - 0.51	0.1435 - 0.1435
beta-BHC	1 / 13	7.7%	0.028 - 0.028	- - -
4,4'-DDD	1 / 13	7.7%	0.0038 - 0.0038	- - -
alpha-Chlordane	1 / 13	7.7%	0.0042 - 0.0042	- - -
Aroclor-1254	1 / 13	7.7%	0.16 - 0.16	- - -
Hexachlorobenzene	9 / 25	36.%	0.0029 - 0.016	0.0045 - 0.0045
Hexachlorobutadiene	1 / 25	4.%	0.0019 - 0.0019	0.0018 - 0.12
Octachlorocyclopentene	1 / 12	8.3%	0.012 - 0.012	0.0015 - 0.014
Chlordene	5 / 12	41.7%	0.0013 - 0.0034	0.0034 - 0.006

- - - Not Detected

TABLE 2-13

SUMMARY OF CHEMICALS OF CONCERN IN DIVING POND SEDIMENTS

Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	5 / 5	100.%	13300 - 15300	7600 - 14600
Chromium	5 / 5	100.%	17.8 - 26.8	11 - 17
Lead	5 / 5	100.%	196 - 511	10.7 - 42
Tin	1 / 1	100.%	47 - 47	- - -
Zinc	5 / 5	100.%	80.7 - 131	42.8 - 116
1,1-Dichloroethene	1 / 5	20.%	0.0299 - 0.0299	- - -
2-Butanone	2 / 4	50.%	0.005 - 0.011	- - -
Trichloroethene	1 / 5	20.%	0.0016 - 0.0016	- - -
Benzene	1 / 5	20.%	0.0403 - 0.0403	- - -
Ethylbenzene	1 / 5	20.%	0.074 - 0.074	- - -
Xylene (total)	4 / 5	80.%	0.008 - 0.261	- - -
Naphthalene	2 / 7	28.6%	0.1341 - 0.14	- - -
2-Methylnaphthalene	5 / 7	71.4%	0.18 - 0.49	- - -
Acenaphthene	2 / 7	28.6%	0.13 - 0.16	- - -
Fluorene	3 / 7	42.9%	0.1 - 0.14	- - -
Phenanthrene	6 / 7	85.7%	0.12 - 0.59	0.05 - 0.21
Fluoranthene	4 / 7	57.1%	0.12 - 0.14	0.06 - 0.39
Pyrene	7 / 7	100.%	0.18 - 0.6907	0.07 - 0.45
Benzo(a)Anthracene	2 / 7	28.6%	0.099 - 0.1	0.04 - 0.25
Chrysene	2 / 7	28.6%	0.11 - 0.14	0.06 - 0.33
bis(2-Ethylhexyl)Phthalate	1 / 7	14.3%	0.1341 - 0.1341	0.091 - 0.091
Benzo(b)Fluoranthene	2 / 7	28.6%	0.1341 - 0.16	0.1 - 0.6
Aroclor-1254	4 / 4	100.%	0.2 - 0.29	- - -
Aroclor-1260	5 / 5	100.%	0.25 - 0.44219	- - -
Hexachlorobenzene	2 / 10	20.%	0.0049 - 0.0072	0.0038 - 0.0038
Hexachlorobutadiene	2 / 10	20.%	0.0023 - 0.0034	0.0066 - 0.035
Heptachloronorborene	2 / 4	50.%	0.0027 - 0.0037	0.0017 - 0.019

- - - Not Detected

TABLE 2-14
SUMMARY OF CHEMICALS OF CONCERN IN TRILOBITE POND SEDIMENTS
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	3 / 3	100.%	32300 - 42700	7600 - 14600
Beryllium	3 / 3	100.%	1.6 - 2.3	0.34 - 1
Chromium	3 / 3	100.%	37.8 - 46.4	11 - 17
Cobalt	3 / 3	100.%	19.4 - 21.6	7.4 - 12.1
Copper	3 / 3	100.%	18.6 - 22.7	16 - 24
Nickel	3 / 3	100.%	34.1 - 39.3	12 - 25
Vanadium	3 / 3	100.%	56.1 - 73.3	18 - 26
bis(2-Ethylhexyl)Phthalate	1 / 6	16.7%	0.26 - 0.26	0.091 - 0.091
Heptachloronorborene	1 / 3	33.3%	0.0017 - 0.0017	0.0017 - 0.019

--- Not Detected

TABLE 2-15
SUMMARY OF CHEMICALS OF CONCERN IN DUCK POND SEDIMENTS
Units in mg/Kg

Compound Name	# of Detections	Percentage of Detections	Range of Detected Concentrations	Range of Background Concentrations
Aluminum	3 / 3	100.%	18600 - 24900	7600 - 14600
Barium	3 / 3	100.%	136 - 209	49.6 - 172
Chromium	3 / 3	100.%	21.3 - 29.7	11 - 17
Cobalt	3 / 3	100.%	15.7 - 18.7	7.4 - 12.1
Copper	3 / 3	100.%	21.1 - 29.3	16 - 24
Nickel	3 / 3	100.%	19.9 - 24	12 - 25
Thallium	3 / 3	100.%	0.42 - 0.61	- - -
Vanadium	3 / 3	100.%	38.7 - 54.6	18 - 26
bis(2-Ethylhexyl)Phthalate	1 / 3	33.3%	0.08 - 0.08	0.091 - 0.091
Hexachlorobenzene	1 / 6	16.7%	0.0032 - 0.0032	0.0038 - 0.0038
Heptachloronorborene	2 / 3	66.7%	0.0017 - 0.0025	0.0017 - 0.019
Chlordene	1 / 3	33.3%	0.00161 - 0.00161	0.0016 - 0.0016

- - - Not Detected

TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Soils		Ground Water	Surface Water				
	Waste Lagoon (mg/Kg)	Site-Wide (mg/Kg)	Unconsolidated and Bedrock Wells (mg/L)	Mill Creek (mg/L)	Skinner Creek (mg/L)	Dump Creek (mg/L)	Diving Pond (mg/L)	Trilobite Pond (mg/L)
Aluminum	- - -	- - -	0.017 - 55.6	- - -	- - -	- - -	- - -	1.02 - 4.61
Antimony	3.4 - 23	4.9 - 14.9	- - -	- - -	- - -	- - -	- - -	- - -
Arsenic	- - -	- - -	0.002 - 0.0612	- - -	- - -	- - -	- - -	- - -
Barium	- - -	- - -	0.003 - 5.95	0.0412 - 0.0683	- - -	- - -	- - -	0.0311 - 0.0438
Beryllium	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Cadmium	1.1 - 56.9	0.54 - 11	0.00053 - 0.064	- - -	- - -	- - -	0.0037 - 0.0058	- - -
Chromium	- - -	6.7 - 97	0.004 - 0.137	- - -	- - -	- - -	- - -	- - -
Cobalt	- - -	- - -	0.003 - 0.31	0.0056 - 0.0056	- - -	- - -	- - -	- - -
Copper	- - -	12 - 574	0.002 - 0.163	- - -	- - -	- - -	- - -	- - -
Lead	6.7 - 4360	3.7 - 1030	0.00282 - 0.54	- - -	- - -	- - -	- - -	- - -
Manganese	- - -	- - -	0.0104 - 18	- - -	0.0163 - 0.0715	- - -	- - -	- - -
Mercury	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Nickel	- - -	- - -	0.009 - 0.41	0.0078 - 0.0078	- - -	- - -	0.0059 - 0.0084	- - -
Silver	0.72 - 13	0.54 - 4.3	- - -	- - -	- - -	- - -	- - -	- - -
Thallium	0.24 - 1	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Tin	155 - 408	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Vanadium	- - -	- - -	0.0021 - 0.135	0.0098 - 0.0098	- - -	- - -	0.0072 - 0.0099	0.006 - 0.0104
Zinc	- - -	36.2 - 10200	0.001 - 1.33	- - -	- - -	- - -	- - -	- - -
Cyanide	2.6 - 43.6	0.84 - 1.8	0.011 - 0.0235	- - -	- - -	- - -	- - -	- - -
Vinyl Chloride	- - -	- - -	0.004 - 0.048	- - -	- - -	- - -	- - -	- - -
Chloroethane	- - -	- - -	0.017 - 0.052	- - -	- - -	- - -	- - -	- - -
Methylene Chloride	0.0064 - 5.3	0.0014 - 7.9	0.003 - 0.014	- - -	- - -	- - -	- - -	- - -
Acetone	0.014 - 140	0.0089 - 34	0.002 - 5.9	- - -	- - -	- - -	- - -	- - -
Carbon Disulfide	- - -	- - -	- - -	0.0003 - 0.0003	- - -	- - -	- - -	- - -
1,1-Dichloroethene	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1,1-Dichloroethane	- - -	- - -	0.001 - 0.082	- - -	- - -	- - -	- - -	- - -
1,2-Dichloroethene	- - -	- - -	0.005 - 4.5	- - -	- - -	- - -	- - -	- - -
Chloroform	0.02 - 33	- - -	0.001 - 0.085	- - -	- - -	- - -	- - -	- - -
1,2-Dichloroethane	0.003 - 210	- - -	0.005 - 0.18	- - -	- - -	- - -	- - -	- - -
2-Butanone	0.24 - 39	0.031 - 0.045	0.006 - 0.036	- - -	- - -	- - -	- - -	- - -
1,1,1-Trichloroethane	0.026 - 63	- - -	0.0026 - 0.012	- - -	- - -	- - -	- - -	- - -
Carbon Tetrachloride	0.041 - 160	- - -	0.003 - 0.0067	- - -	- - -	- - -	- - -	- - -
1,2-Dichloropropane	0.14 - 340	- - -	0.021 - 0.37	- - -	- - -	- - -	- - -	- - -
Trichloroethene	0.006 - 140	- - -	0.002 - 0.071	- - -	- - -	- - -	- - -	- - -
Dibromochloromethane	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1,1,2-Trichloroethane	0.073 - 370	- - -	0.055 - 0.055	- - -	- - -	- - -	- - -	- - -
Benzene	0.007 - 60	0.00049 - 0.0022	0.001 - 20	- - -	- - -	- - -	- - -	- - -

TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Soils		Ground Water	Surface Water				
	Waste Lagoon (mg/Kg)	Site-Wide (mg/Kg)	Unconsolidated and Bedrock Wells (mg/L)	Mill Creek (mg/L)	Skinner Creek (mg/L)	Dump Creek (mg/L)	Diving Pond (mg/L)	Trilobite Pond (mg/L)
4-Methyl-2-Pentanone	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2-Hexanone	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Tetrachloroethene	0.049 - 44	0.0021 - 2.7	0.001 - 0.02	- - -	- - -	- - -	- - -	- - -
1,1,2,2-Tetrachloroethane	0.04 - 130	- - -	0.006 - 0.006	- - -	- - -	- - -	- - -	- - -
Toluene	0.001 - 31000	0.001 - 0.36	0.0013 - 3.1	- - -	- - -	- - -	- - -	- - -
Chlorobenzene	5 - 15	0.002 - 0.002	0.001 - 0.027	- - -	- - -	- - -	- - -	- - -
Ethylbenzene	0.0008 - 98	0.001 - 0.002	0.005 - 0.08	- - -	- - -	- - -	- - -	- - -
Xylene (total)	0.001 - 200	0.001 - 0.016	0.034 - 0.18	0.003 - 0.003	- - -	- - -	- - -	- - -
Phenol	0.48 - 26	- - -	0.002 - 0.67	0.0006 - 0.0089	0.003 - 0.003	- - -	0.0022 - 0.0022	0.001 - 0.001
bis(2-Chloroethyl)Ether	0.22 - 21	- - -	0.001 - 0.24	- - -	- - -	- - -	- - -	- - -
1,3-Dichlorobenzene	0.043 - 230	- - -	- - -	- - -	- - -	- - -	- - -	- - -
1,4-Dichlorobenzene	0.13 - 180	- - -	0.0035 - 0.011	- - -	- - -	- - -	- - -	- - -
Benzyl Alcohol	0.94 - 9.2	- - -	0.001 - 0.001	- - -	- - -	- - -	- - -	- - -
1,2-Dichlorobenzene	0.43 - 94	- - -	0.006 - 0.006	- - -	- - -	- - -	- - -	- - -
2-Methylphenol	0.17 - 7.8	- - -	0.45 - 0.45	- - -	- - -	- - -	- - -	- - -
bis(2-Chloroisopropyl)Ether	- - -	- - -	- - -	- - -	- - -	0.003 - 0.003	- - -	- - -
4-Methylphenol	0.57 - 26	0.11 - 0.14	0.14 - 0.35	- - -	- - -	- - -	- - -	- - -
Hexachloroethane	0.69 - 19	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Nitrobenzene	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Benzoic Acid	1.6 - 1100	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Naphthalene	0.11 - 610	0.22 - 0.22	0.00073 - 0.064	- - -	- - -	- - -	- - -	- - -
2-Methylnaphthalene	0.036 - 220	0.064 - 0.064	0.003 - 0.003	- - -	- - -	- - -	- - -	- - -
Dimethyl Phthalate	0.12 - 67	- - -	- - -	- - -	- - -	- - -	- - -	0.001 - 0.001
Acenaphthylene	1 - 41	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Acenaphthene	0.035 - 7.9	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Dibenzofuran	0.079 - 7	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Diethylphthalate	- - -	0.078 - 0.078	- - -	0.002 - 0.004	0.001 - 0.003	- - -	- - -	0.001 - 0.002
Fluorene	0.067 - 34	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Pentachlorophenol	- - -	- - -	0.015 - 0.26	- - -	- - -	- - -	- - -	- - -
Phenanthrene	0.058 - 110	0.085 - 4.2	- - -	- - -	- - -	- - -	- - -	- - -
Anthracene	0.19 - 84	0.092 - 0.34	- - -	- - -	- - -	- - -	- - -	- - -
Di-n-Butylphthalate	0.052 - 15	0.055 - 0.49	0.00061 - 0.003	0.0001 - 0.01	- - -	- - -	- - -	- - -
Fluoranthene	0.049 - 31	0.12 - 7.9	- - -	- - -	- - -	- - -	- - -	- - -
Pyrene	0.12 - 48	0.13 - 8.5	- - -	- - -	- - -	0.001 - 0.001	- - -	- - -
Butylbenzylphthalate	0.063 - 25	0.43 - 7	- - -	- - -	0.003 - 0.003	- - -	- - -	- - -
Benzo(a)Anthracene	0.43 - 15	0.069 - 4.34	- - -	- - -	- - -	- - -	- - -	- - -
Chrysene	0.56 - 17	0.06 - 5.56	- - -	- - -	- - -	- - -	- - -	- - -
bis(2-Ethylhexyl)Phthalate	0.053 - 150	0.045 - 12	0.001 - 0.012	0.0816 - 0.0816	0.1319 - 0.1319	- - -	0.0409 - 0.0409	- - -
Di-n-Octyl Phthalate	3.9 - 10	0.07 - 0.96	- - -	0.0043 - 0.0043	0.0036 - 0.0036	- - -	- - -	- - -

TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Soils		Ground Water	Surface Water				
	Waste Lagoon (mg/Kg)	Site-Wide (mg/Kg)	Unconsolidated and Bedrock Wells (mg/L)	Mill Creek (mg/L)	Skinner Creek (mg/L)	Dump Creek (mg/L)	Diving Pond (mg/L)	Trilobite Pond (mg/L)
Benzo(b)Fluoranthene	0.55 - 7	0.22 - 6.17	- - -	- - -	- - -	- - -	- - -	- - -
Benzo(k)Fluoranthene	0.29 - 5	0.05 - 0.76	- - -	- - -	- - -	- - -	- - -	- - -
Benzo(a)Pyrene	0.38 - 10	0.062 - 5.6	- - -	- - -	- - -	- - -	- - -	- - -
Indeno(1,2,3-cd)Pyrene	0.2 - 3.4	0.29 - 1.5	- - -	- - -	- - -	- - -	- - -	- - -
Dibenzo(a,h)Anthracene	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Benzo(g,h,i)Perylene	0.16 - 4.1	0.31 - 1.7	- - -	- - -	- - -	- - -	- - -	- - -
beta-BHC	0.0077 - 0.0096	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Heptachlor	0.0082 - 52	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Aldrin	0.64 - 11	- - -	0.0005 - 0.0005	- - -	- - -	- - -	- - -	- - -
Dieldrin	1.7 - 1.9	- - -	0.00013 - 0.00013	- - -	- - -	- - -	- - -	- - -
4,4'-DDE	- - -	0.044 - 0.044	- - -	- - -	- - -	- - -	- - -	- - -
Endrin	- - -	0.61 - 0.65	- - -	- - -	- - -	- - -	- - -	- - -
4,4'-DDD	0.079 - 0.079	0.01 - 0.11	- - -	- - -	- - -	- - -	- - -	- - -
4,4'-DDT	0.055 - 0.055	0.013 - 0.097	0.00006 - 0.00009	- - -	- - -	- - -	- - -	- - -
Endrin ketone	0.045 - 84	- - -	- - -	- - -	- - -	- - -	- - -	- - -
alpha-Chlordane	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
gamma-Chlordane	1.8 - 44	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Aroclor-1248	0.55 - 0.78	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Aroclor-1254	- - -	0.14 - 980	0.0002 - 0.0002	- - -	- - -	- - -	- - -	- - -
Aroclor-1260	0.46 - 1.2	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Hexachlorobenzene	0.00093 - 1800	0.073 - 23	0.00002 - 0.00024	- - -	- - -	- - -	0.000033 - 0.000033	- - -
Hexachlorocylopentadiene	0.17 - 4300	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Hexachlorobutadiene	0.0012 - 260	0.0017 - 0.0041	0.000015 - 0.000087	- - -	- - -	- - -	0.000008 - 0.000008	2.9E-06 - 0.000011
Octachlorocyclopentene	0.83 - 23000	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Heptachloronorborene	0.0015 - 2500	0.0011 - 0.0027	0.000052 - 0.00011	- - -	- - -	- - -	- - -	- - -
Chlordene	0.0011 - 1200	- - -	- - -	- - -	- - -	- - -	- - -	- - -
2,3,7,8-TCDD	2.76E-05 - 2.94E-05	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total TETRA CDD	2.76E-05 - 0.00014	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total PENTA CDD	8E-07 - 0.000173	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total HEXA CDD	1.96E-05 - 0.000189	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total HEPTA CDD	0.000105 - 0.000309	0.000001 - 0.000205	- - -	- - -	- - -	- - -	- - -	- - -
Total OCTA CDD	0.003165 - 0.003165	0.000192 - 0.000192	- - -	- - -	- - -	- - -	- - -	- - -
2,3,7,8-TCDF	9.6E-06 - 0.000022	0.000008 - 0.000008	- - -	- - -	- - -	- - -	- - -	- - -
Total TETRA CDF	7.4E-06 - 0.002305	0.000008 - 0.000008	- - -	- - -	- - -	- - -	- - -	- - -
Total PENTA CDF	1.03E-05 - 0.002157	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total HEXA CDF	7.17E-05 - 0.005469	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total HEPTA CDF	0.000104 - 0.003731	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Total OCTA CDF	0.000019 - 0.015109	- - -	- - -	- - -	- - -	- - -	- - -	- - -

- - - Not Detected

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TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Sediments					
	Mill Creek (mg/Kg)	Skinner Creek (mg/Kg)	Dump Creek (mg/Kg)	Duck Pond (mg/Kg)	Diving Pond (mg/Kg)	Trilobite Pond (mg/Kg)
Aluminum	- - -	8860 - 15900	- - -	18600 - 24900	13300 - 15300	32300 - 42700
Antimony	- - -	- - -	- - -	- - -	- - -	- - -
Arsenic	- - -	- - -	- - -	- - -	- - -	- - -
Barium	- - -	- - -	- - -	136 - 209	- - -	- - -
Beryllium	- - -	- - -	- - -	- - -	- - -	1.6 - 2.3
Cadmium	- - -	- - -	- - -	- - -	- - -	- - -
Chromium	- - -	- - -	- - -	21.3 - 29.7	17.8 - 26.8	37.8 - 46.4
Cobalt	- - -	- - -	- - -	15.7 - 18.7	- - -	19.4 - 21.6
Copper	- - -	- - -	- - -	21.1 - 29.3	- - -	18.6 - 22.7
Lead	10 - 43	21 - 139	- - -	- - -	196 - 511	- - -
Manganese	- - -	- - -	- - -	- - -	- - -	- - -
Mercury	0.12 - 0.13	- - -	- - -	- - -	- - -	- - -
Nickel	- - -	- - -	- - -	19.9 - 24	- - -	34.1 - 39.3
Silver	- - -	- - -	- - -	- - -	- - -	- - -
Thallium	- - -	- - -	- - -	0.42 - 0.61	- - -	- - -
Tin	- - -	40 - 52	37 - 37	- - -	47 - 47	- - -
Vanadium	- - -	18 - 32.3	- - -	38.7 - 54.6	- - -	56.1 - 73.3
Zinc	- - -	- - -	- - -	- - -	80.7 - 131	- - -
Cyanide	- - -	- - -	- - -	- - -	- - -	- - -
Vinyl Chloride	- - -	- - -	- - -	- - -	- - -	- - -
Chloroethane	- - -	- - -	- - -	- - -	- - -	- - -
Methylene Chloride	- - -	- - -	0.968 - 0.968	- - -	- - -	- - -
Acetone	0.007 - 0.016	0.023 - 0.062	0.074 - 0.31	- - -	- - -	- - -
Carbon Disulfide	0.0009 - 0.0014	- - -	- - -	- - -	- - -	- - -
1,1-Dichloroethene	- - -	- - -	- - -	- - -	0.0299 - 0.0299	- - -
1,1-Dichloroethane	- - -	- - -	- - -	- - -	- - -	- - -
1,2-Dichloroethene	- - -	0.083 - 0.083	- - -	- - -	- - -	- - -
Chloroform	- - -	- - -	- - -	- - -	- - -	- - -
1,2-Dichloroethane	- - -	- - -	- - -	- - -	- - -	- - -
2-Butanone	- - -	- - -	- - -	- - -	0.005 - 0.011	- - -
1,1,1-Trichloroethane	- - -	- - -	- - -	- - -	- - -	- - -
Carbon Tetrachloride	- - -	- - -	- - -	- - -	- - -	- - -
1,2-Dichloropropane	- - -	- - -	- - -	- - -	- - -	- - -
Trichloroethene	- - -	0.02 - 0.02	- - -	- - -	0.0016 - 0.0016	- - -
Dibromochloromethane	- - -	- - -	- - -	- - -	- - -	- - -
1,1,2-Trichloroethane	- - -	- - -	- - -	- - -	- - -	- - -
Benzene	- - -	- - -	- - -	- - -	0.0403 - 0.0403	- - -

TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Sediments					
	Mill Creek (mg/Kg)	Skinner Creek (mg/Kg)	Dump Creek (mg/Kg)	Duck Pond (mg/Kg)	Diving Pond (mg/Kg)	Trilobite Pond (mg/Kg)
4-Methyl-2-Pentanone	0.0013 - 0.0016	0.0049 - 0.0049	- - -	- - -	- - -	- - -
2-Hexanone	- - -	0.0051 - 0.0051	- - -	- - -	- - -	- - -
Tetrachloroethene	- - -	- - -	- - -	- - -	- - -	- - -
1,1,2,2-Tetrachloroethane	- - -	0.002 - 0.002	- - -	- - -	- - -	- - -
Toluene	- - -	- - -	- - -	- - -	- - -	- - -
Chlorobenzene	- - -	- - -	- - -	- - -	- - -	- - -
Ethylbenzene	- - -	- - -	- - -	- - -	0.074 - 0.074	- - -
Xylene (total)	- - -	- - -	- - -	- - -	0.008 - 0.261	- - -
Phenol	0.055 - 0.1397	- - -	- - -	- - -	- - -	- - -
bis(2-Chloroethyl)Ether	- - -	- - -	- - -	- - -	- - -	- - -
1,3-Dichlorobenzene	- - -	- - -	- - -	- - -	- - -	- - -
1,4-Dichlorobenzene	- - -	- - -	- - -	- - -	- - -	- - -
Benzyl Alcohol	- - -	- - -	- - -	- - -	- - -	- - -
1,2-Dichlorobenzene	- - -	- - -	- - -	- - -	- - -	- - -
2-Methylphenol	- - -	- - -	- - -	- - -	- - -	- - -
bis(2-Chloroisopropyl)Ether	- - -	- - -	- - -	- - -	- - -	- - -
4-Methylphenol	0.0165 - 1.5542	0.0105 - 0.0191	- - -	- - -	- - -	- - -
Hexachloroethane	- - -	- - -	- - -	- - -	- - -	- - -
Nitrobenzene	- - -	0.0042 - 0.0042	- - -	- - -	- - -	- - -
Benzoic Acid	- - -	- - -	- - -	- - -	- - -	- - -
Naphthalene	0.022 - 0.38	0.0166 - 0.0648	0.18 - 0.18	- - -	0.1341 - 0.14	- - -
2-Methylnaphthalene	0.002 - 0.045	0.0235 - 0.1007	0.12 - 0.16	- - -	0.18 - 0.49	- - -
Dimethyl Phthalate	- - -	- - -	- - -	- - -	- - -	- - -
Acenaphthylene	0.0184 - 0.12	- - -	- - -	- - -	- - -	- - -
Acenaphthene	0.4 - 0.4	0.14 - 0.14	- - -	- - -	0.13 - 0.16	- - -
Dibenzofuran	0.042 - 0.28	0.0073 - 0.13	0.15 - 0.15	- - -	- - -	- - -
Diethylphthalate	0.0335 - 0.0517	0.021 - 0.0283	- - -	- - -	- - -	- - -
Fluorene	0.0271 - 0.39	0.008 - 0.22	0.22 - 0.22	- - -	0.1 - 0.14	- - -
Pentachlorophenol	- - -	- - -	- - -	- - -	- - -	- - -
Phenanthrene	0.0905 - 2.9	0.0151 - 1.8	0.152 - 2	- - -	0.12 - 0.59	- - -
Anthracene	0.047 - 0.58	0.014 - 0.31	0.51 - 0.51	- - -	- - -	- - -
Di-n-Butylphthalate	- - -	0.073 - 0.16	0.071 - 0.071	- - -	- - -	- - -
Fluoranthene	0.11 - 3.3	0.0313 - 2.5	0.13 - 1.9	- - -	0.12 - 0.14	- - -
Pyrene	0.089 - 3.2	0.0217 - 1.5	0.134 - 1.9	- - -	0.18 - 0.6907	- - -
Butylbenzylphthalate	- - -	- - -	- - -	- - -	- - -	- - -
Benzo(a)Anthracene	0.0476 - 1.6	0.0876 - 0.68	0.124 - 0.83	- - -	0.099 - 0.1	- - -
Chrysene	0.0602 - 1.9	0.056 - 0.69	0.12 - 0.88	- - -	0.11 - 0.14	- - -
bis(2-Ethylhexyl)Phthalate	0.043 - 0.18	- - -	0.033 - 0.57	0.08 - 0.08	0.1341 - 0.1341	0.26 - 0.26
Di-n-Octyl Phthalate	- - -	- - -	- - -	- - -	- - -	- - -

TABLE 2-16
SUMMARY OF CONCENTRATION RANGES OF CHEMICALS OF CONCERN

Chemical	Sediments					
	Mill Creek (mg/Kg)	Skinner Creek (mg/Kg)	Dump Creek (mg/Kg)	Duck Pond (mg/Kg)	Diving Pond (mg/Kg)	Trilobite Pond (mg/Kg)
Benzo(b)Fluoranthene	0.0366 - 1.7	0.0116 - 0.51	0.103 - 1.1	- - -	0.1341 - 0.16	- - -
Benzo(k)Fluoranthene	0.0375 - 1.2	0.0146 - 0.51	0.079 - 0.16	- - -	- - -	- - -
Benzo(a)Pyrene	0.069 - 1.4	0.0084 - 0.33	0.125 - 0.74	- - -	- - -	- - -
Indeno(1,2,3-cd)Pyrene	0.099 - 0.61	0.0394 - 0.26	0.059 - 0.059	- - -	- - -	- - -
Dibenzo(a,h)Anthracene	0.055 - 0.13	- - -	- - -	- - -	- - -	- - -
Benzo(g,h,i)Perylene	0.078 - 0.51	0.048 - 0.21	0.055 - 0.055	- - -	- - -	- - -
beta-BHC	0.028 - 0.028	- - -	- - -	- - -	- - -	- - -
Heptachlor	- - -	- - -	- - -	- - -	- - -	- - -
Aldrin	- - -	- - -	- - -	- - -	- - -	- - -
Dieldrin	- - -	- - -	- - -	- - -	- - -	- - -
4,4'-DDE	- - -	- - -	- - -	- - -	- - -	- - -
Endrin	- - -	- - -	- - -	- - -	- - -	- - -
4,4'-DDD	0.0038 - 0.0038	- - -	- - -	- - -	- - -	- - -
4,4'-DDT	- - -	- - -	- - -	- - -	- - -	- - -
Endrin ketone	- - -	- - -	- - -	- - -	- - -	- - -
alpha-Chlordane	0.0042 - 0.0042	- - -	- - -	- - -	- - -	- - -
gamma-Chlordane	- - -	- - -	- - -	- - -	- - -	- - -
Aroclor-1248	- - -	- - -	- - -	- - -	- - -	- - -
Aroclor-1254	0.16 - 0.16	- - -	- - -	- - -	0.2 - 0.29	- - -
Aroclor-1260	- - -	0.01143 - 0.02985	- - -	- - -	0.25 - 0.44219	- - -
Hexachlorobenzene	0.0029 - 0.016	0.003 - 0.003	- - -	0.0032 - 0.0032	0.0049 - 0.0072	- - -
Hexachlorocylopentadiene	- - -	0.052 - 0.067	- - -	- - -	- - -	- - -
Hexachlorobutadiene	0.0019 - 0.0019	0.0021 - 0.027	0.0025 - 0.0025	- - -	0.0023 - 0.0034	- - -
Octachlorocyclopentene	0.012 - 0.012	- - -	- - -	- - -	- - -	- - -
Heptachloronorborene	- - -	0.0012 - 0.029	- - -	0.0017 - 0.0025	0.0027 - 0.0037	0.0017 - 0.0017
Chlordene	0.0013 - 0.0034	0.0013 - 0.0049	- - -	0.00161 - 0.00161	- - -	- - -
2,3,7,8-TCDD	- - -	- - -	- - -	- - -	- - -	- - -
Total TETRA CDD	- - -	- - -	- - -	- - -	- - -	- - -
Total PENTA CDD	- - -	- - -	- - -	- - -	- - -	- - -
Total HEXA CDD	- - -	- - -	- - -	- - -	- - -	- - -
Total HEPTA CDD	- - -	- - -	- - -	- - -	- - -	- - -
Total OCTA CDD	- - -	- - -	- - -	- - -	- - -	- - -
2,3,7,8-TCDF	- - -	- - -	- - -	- - -	- - -	- - -
Total TETRA CDF	- - -	- - -	- - -	- - -	- - -	- - -
Total PENTA CDF	- - -	- - -	- - -	- - -	- - -	- - -
Total HEXA CDF	- - -	- - -	- - -	- - -	- - -	- - -
Total HEPTA CDF	- - -	- - -	- - -	- - -	- - -	- - -
Total OCTA CDF	- - -	- - -	- - -	- - -	- - -	- - -

- - - Not Detected

3.0 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate the type and magnitude of exposures to the chemicals of potential concern that are present at or migrating from the site. The results of the exposure assessment are combined with chemical-specific toxicity information to characterize potential risks.

Exposure is defined as the contact of an organism (humans in the case of health risk assessment) with a chemical or physical agent (U.S. EPA, 1988a). The magnitude of exposure is determined by measuring or estimating the amount of an agent available at the exchange boundaries (i.e., the lungs, gut, skin) during a specified time period. Exposure assessment is the determination or estimation (qualitative or quantitative) of the magnitude, frequency, duration, and route of exposure. Exposure assessments are generally concerned with current and future exposures. Estimates of current exposures can be based on measurements or models of existing conditions and estimates of future exposures can be based on models of future conditions.

3.1 EXPOSURE SETTING

The Skinner property is comprised of approximately 78 acres of hilly terrain, bordered on the immediate south by the East Fork of Mill Creek. The property is bordered to the north by wooded and open land, to the east by a Consolidated Rail Corporation (Conrail) right-of-way, to the south across the East Fork of Mill Creek by agricultural and wooded land and to the west by the Cincinnati-Dayton Road. Two residences are located on the property. The principal residential area is west of the landfill; however, approximately 13 residences are located within 2,000 feet of the closed landfill to the south and west (Figure 1), and a residential area is located approximately 0.5 miles east of the property. The area under investigation consists of the closed Skinner Landfill, adjacent areas, and residential wells near the landfill.

3.1.1 CLIMATE AND METEOROLOGY

The temperature in this area averages 55°F with monthly averages ranging from 77°F in July to 33°F in January. Total precipitation averages 39 inches annually and of this precipitation, snow and sleet average 17 inches. Relative humidity of this area averages 71 percent. Average wind speeds are 7.4 miles/hour and are predominantly from the southwest. (Climates of the States, 1974.)

3.1.2 GEOLOGY AND SOILS

The geologic conditions present beneath the Skinner site, as revealed by the Phase I and Phase II borings, are consistent with the regional geologic setting. Bedrock consists of thinly bedded Ordovician carbonates and shales which may form steep walled bedrock valleys. The bedrock surface topography is dominated by two high areas, one beneath the hill southeast of Diving Pond and the second beneath and to the north of the buried waste lagoon. Visual inspection of the carbonate bedrock exposed along the East Fork of Mill Creek and at the Trilobite Pond reveals a prominent fracture system oriented approximately north-south with a secondary, less pronounced, less continuous fracture system occurring at approximately a 90 degree angle to the first. Fracture spacing varies between four and fourteen inches in both fracture sets.

The glacial history in the Cincinnati area is represented by the unconsolidated sediment deposits which grade from clay to gravel, reflecting the cyclical depositional settings associated with an advancing and retreating ice sheet. Correlation of the unconsolidated sediments is more obvious along the valley axes and the depositional strike. Unconsolidated sediment thickness is as great as 60 feet. Bedrock valleys are slowly being reexcavated by the post-glacial streams. These streams are also modifying the bedrock surface where carbonate and shale are exposed in the East Fork of Mill Creek valley.

The infiltration of precipitation into the glacial sediments provides the majority of ground water recharge at the Skinner site. Infiltrating precipitation produces locally perched ground water conditions. This condition was encountered above less permeable sediments during the waste lagoon investigation. The infiltration of water through the debris and buried waste lagoon likely produces the leachate observed discharging to the East Fork of Mill Creek.

3.1.3 VEGETATION

Much of the vegetation at the site is disturbed due to past gravel mining operations and present landfill, earth moving, and scrap metal operations. There are several fairly distinct areas with different plant communities: barren areas where recent earth moving has disturbed or destroyed the plant communities, the former landfill area, the buried lagoon area, the buried pit area, pasture, steeply sloped areas, and creek banks.

The areas around the Diving Pond and the Trilobite Pond have been recently disturbed and support little vegetation of any kind. The northeast corner of the site is a former municipal landfill and supports little vegetation. The area over the buried lagoon is thickly vegetated with grasses such as foxtail grass and weeds. The area over the buried pit is barren and is used as a road. There is a horse pasture in the southwest corner of the site; one horse has been observed there. Steep wooded slopes occupy much of the remaining area of the site. These slopes support trees such as sycamore, locust, walnut, cottonwood, sugar maple, and northern hackberry. Areas along the creeks are mostly wooded and support trees such as cottonwood, silver maple, and sycamore. Staghorn sumac and osage orange occur at scattered locations throughout the site.

No vegetable gardens or agricultural areas other than the horse pasture were observed on the site. Wild onions were abundant is some low areas along the creeks. No other significant concentrations of edible wild plants were observed.

3.1.4 Ground Water

The principle sources of ground water in the Cincinnati area are the deposits of sand and gravel, interbedded with lenses of clay and silt, that fill the valleys of the pre-glacial drainage system. These deposits are among the most productive aquifers of glacial origin in the United States. Calculated vertical gradients in the bedrock are larger than the horizontal gradients. However, the very low vertical permeability inferred to exist within the thinly bedded shales and limestones indicates the greatest component of flow to be in the horizontal direction. This flow follows the bedding planes and the fractures within the limestone layers. Refer to the Phase II RI report (WWES, 1991a), Section 5, for a more complete discussion.

Horizontal flow in the glacial sand and gravels is toward Skinner Creek, Mill Creek, or the bedrock valley parallel to the main access road in the center of the site. Ground water originating on the east side of the waste lagoon also flows toward Mill Creek.

Ground water deriving from the area to the north of GW-17 and GW-18 may flow adjacent to GW-15 and into the Skinner Creek basin. The flow regime in this area is poorly defined.

3.1.5 Surface Water

Three small creeks and three ponds are the predominant surface water features at the site (Figure 2). The three creeks include Skinner Creek, the East Fork of Mill Creek and Dump Creek. Skinner Creek has an average gradient of 0.02, an estimated average flow of 2 cubic feet per second and flows entirely on the unconsolidated sediments. The East Fork of Mill Creek is a rapidly flowing stream with an average gradient of 0.01 and an estimated average flow of 10.6 cubic feet per second. This creek flows on bedrock in the southern portions of the site, is subject to flash flooding, and is capable of scouring sediments during flooding. Such scouring could mobilize contaminated sediments off the Skinner site. Dump Creek is a very small intermittent stream. Skinner and Mill Creeks are used mostly for recreation. Mill Creek supports small fish and other non-game wildlife. Vegetation along the creeks is described in Section 3.1.3. No fish were captured in a fish survey of Skinner Creek. Dump Creek is intermittent and does not support any fish.

During investigations at the site the ponds on the site were designated Diving Pond (9,400 ft^2) and Trilobite Pond (6,600 ft^2). Duck Pond (25,000 ft^2) is located on the adjacent property immediately north of the site (see Figure 2). The ponds appear to have no use and no fish are known to inhabit them, although the property owner on several occasions has stated that he has stocked the Trilobite pond and intends to turn it into a pay lake.

Two other ponds which were formerly located on the west side of the site no longer exist. One has been filled in and two others have been combined to form one pond (now Trilobite Pond). The topographical alterations are the results of excavation activities conducted by the landfill operator, Ray Skinner, in the late part of 1989.

3.2 POTENTIALLY EXPOSED POPULATIONS

3.2.1 Current Populations

Populations in the vicinity of the Skinner Landfill include three on-site residences (with an additional residence immediately adjacent to the site), workers at the landfill operation, children attending a day care center and an elementary school near the site, and residents of the surrounding West Chester/Union Township area. Census data from 1990 indicate the population of Union Township is 38,600.

There are three populations that have different activity patterns and may be exposed to chemicals of concern that originate from the landfill. These populations are occupational, residential, and recreational populations. Within the residential and recreational populations are subpopulations of children and adults that may experience different exposures due to differing activity patterns, body weights, skin surface areas and other factors. Approximately ten children attend a day care center located on the southwestern edge of the site. There are also three households on the site, including one family with young children. The occupational population consists only of the adult subpopulation, as children (ages 1-7) are not employed at the site. There are one or two full-time site workers and several part-time or seasonal employees at the site.

Both long-term (chronic) and short-term (subchronic) exposures may occur, and different populations or subpopulations may receive long- or short-term exposures. Chronic toxicity values were used to evaluate adult exposures and subchronic toxicity values were used to evaluate exposures of children.

3.2.2 CURRENT LAND USE

There are three residences on the site and approximately 13 single-family residences within 2000 feet of the site on the southern and western borders of the property. An elementary school with 780 students is located just west of the property across the Cincinnati-Dayton Highway. A small day care center for approximately 10 children is located on the southwestern border of the property. There is a post office on the Cincinnati-Dayton Highway that is adjacent to the site.

The landfill property is hilly and large portions are wooded, providing a potential recreational area for both children and adults. Three creeks (Skinner, Dump, and the East Fork of Mill Creek) and three ponds (Duck, Diving, and Trilobite Ponds) on or adjacent to the site may serve as an attraction for summer recreation activities (i.e., swimming). These ponds and creeks are depicted in Figure 2. No information is available concerning the current use of the property for recreational purposes. There are no significant access restrictions in place on the property.

3.2.3 FUTURE LAND USE

It was assumed that the property could be used for residential development in the future. This assumption is based on the current use of surrounding properties, which are largely residential, and an examination of an available zoning map which indicates that zoning of the property for residential use would be consistent with surrounding land uses. It is unlikely that residences would be placed over the waste lagoon, which is a formerly active portion of the landfill. However, the future land use scenario includes this possibility. Future residential exposures have been calculated with and without residential development over the waste lagoon. It was also assumed that residential development on the property does not preclude its use for commercial or light industrial development as well. Future populations could both reside and work on the property.

3.2.4 SUBPOPULATIONS OF POTENTIAL CONCERN

Those with the greatest potential for exposure to contaminants at and migrating from the site are the populations of greatest concern. They include residents on and adjacent to the landfill property, facility workers, and recreational users of the property. Recreational users include those people using the creeks and ponds on and adjacent to the property and those individuals using the site to gain access to these resources.

Within the residential and recreational populations are the subpopulations of children and adults. Due to their relatively low body weights, and because they are still in developmental stages of growth and maturation, children are the subpopulation of greatest concern.

3.2.5 REASONABLE MAXIMUM EXPOSURES

Actions at Superfund sites are based on an estimate of the reasonable maximum exposure (RME) expected to occur under both current and future land use conditions. The RME is defined as the highest exposure that is reasonably expected to occur at a site (U.S. EPA, 1989a). The determination of "reasonable" is based on quantitative information, standard assumptions, and best professional judgement. The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures. RMEs are estimated for individual pathways. If a population or subpopulation is exposed by more than one pathway, the combination of exposures across pathways must also be evaluated.

The assumptions used to develop estimates of the values of parameters used in the intake equations for each exposure route define the RME. Some intake variables may not be at their individual maximum values, but when combined with other variables result in estimates of the RME. The RME's for each exposure pathway are defined in Section 3.3.3.

3.3 EXPOSURE PATHWAYS

This section describes the potential human exposure pathways at the site. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual. An exposure pathway analysis links the sources, locations, and types of environmental releases with population locations and activity patterns to determine the significant pathways of human exposure.

An exposure pathway generally consists of four elements: (1) a source and mechanism of chemical release or potential release, (2) a retention or transport medium (or media in the cases involving media transfer of chemicals), (3) a point of potential human contact with the contaminated medium (referred to as the exposure point), and (4) an exposure route (e.g., ingestion of drinking water) at the exposure point. Each pathway describes the mechanism by which an individual or population may be exposed to contaminants that may have originated from the site. The overall risks posed by a site are a composite of the set of individual pathway risks. Risks for individual pathways, however, may not be additive because they may represent risks to different populations.

3.3.1 SOURCES AND RECEIVING MEDIA

The source of the chemicals of concern at the site is the waste material that was disposed of in the landfill over the past fifty years. Soils have been contaminated with the chemicals of concern and are a receiving media. Sampling and analyses indicate that ground water has been impacted by some chemicals of concern. Impacted ground water may discharge into on-site surface water features, including Skinner Creek, Dump Creek, and the East Fork of Mill Creek and Diving, Duck, and Trilobite Ponds. Sampling and analyses indicate that these surface water bodies have been impacted by chemicals of concern. Several damp seeps have been located along the banks of East Fork of Mill Creek and one along Skinner Creek, that could be a conduit for leachate to enter the creeks. Sediments in these surface water bodies are also potential receiving media, as surface water runoff and ground water discharge may have carried contaminants to the sediments. Sampling and analyses indicate that some sediments contain chemicals of concern.

There is also a potential for release of chemicals to air via volatilization from impacted soils and surface water or through fugitive dust emissions. However, sampling has indicated that the concentrations of volatile chemicals in surface soils and water are relatively low and do not represent a major source of chemicals of concern to air. The depth of contaminated soils in the buried lagoon (20 to 25 feet) limits emission of volatile chemicals from these soils. Additionally, the property is protected in several areas from fugitive dust emissions by vegetative cover and a hilly terrain. Those regions that are not vegetated are not known to be areas of extensive contamination. Also, inhalation toxicity values are not available for most of the chemicals of concern (see Section 4.0), so the risks due to emissions from soil cannot be completely quantified. For these reasons modeling of concentrations of chemicals in air has not been conducted for the site.

3.3.2 FATE AND TRANSPORT

The potential environmental transport media are surface soils, air, surface water, and ground water. As discussed above, the potential transport of chemicals in air or fugitive emissions has not been considered quantitatively in this assessment.

There are currently two residential wells used for drinking water on site; both current and future land use scenarios include an assessment of potential health effects due to ground water consumption. Surface water has been evaluated due to the potential for transport of materials through surface runoff or ground water discharge of chemicals of concern.

The chemicals of potential concern at the Skinner Landfill fall into several major groups:

- inorganic chemicals;
- chlorinated aliphatic hydrocarbons;
- monocyclic aromatic hydrocarbons;
- polycyclic aromatic hydrocarbons;
- phthalate esters;
- ketones;
- pesticides and PCBs;
- dioxins and furans; and
- other organic chemicals.

Table 3-1 lists the chemicals of potential concern at the Skinner Landfill that are in each of these groups. Chemicals within each of these groups have similar properties that affect their environmental fate and transport. The general properties of each group are summarized below.

Inorganic Chemicals

Inorganic chemicals that are chemicals of potential concern at the site are listed in Table 3-1. These chemicals are variable in their environmental fate characteristics. Conditions that control inorganic speciation are important in determining the fate of inorganics. These conditions include redox potential (Eh) and acidity/basicity (pH). The Eh and pH of the soil affect the degree to which the following mechanisms control the fate of inorganics: adsorption by soil; precipitation or coprecipation; adsorption to iron, aluminium, and manganese oxides; and complexation with organic matter; and ion exchange. Certain forms of some inorganic chemicals (such as methylated mercury, cadmium, and arsenic) are very bioaccumulative, while other inorganics have little tendency to bioconcentrate.

Chlorinated aliphatic hydrocarbons

Table 3-1 lists the chemicals of potential concern at the Skinner Landfill that are chlorinated aliphatic hydrocarbons. These chemicals in general have high aqueous solubilities, high vapor pressures, low soil adsorption, very slow hydrolysis rates, and relatively rapid oxidation rates (U.S. EPA, 1979). These chemicals are known to volatilize and subsequently undergo photo-oxidation or chemical oxidation in the atmosphere after volatilizing from soils or surface water. Chlorinated aliphatic hydrocarbons in ground water have very slow degradation rates, but are readily transported to downgradient areas and discharge areas by ground water advection. When these chemicals discharge from ground water to surface water they tend to volatilize rapidly. In the atmosphere they are degraded by oxidation. The chlorinated aliphatic hydrocarbons generally have quite low bioconcentration factors.

Monocyclic Aromatic Hydrocarbons

Monocyclic aromatic hydrocarbons that are chemicals of potential concern at the Skinner Landfill are identified on Table 3-1. These chemicals are characterized by low aqueous solubility, moderate to high vapor pressures, low bioconcentration factors, and low to moderate adsorption to soils. Volatilization is the major removal mechanism from soil and surface water, and photo-oxidation is the primary mechanism for atmospheric destruction of these chemicals (U.S. EPA, 1979; Howard, 1989). Monocyclic aromatic hydrocarbons are expected to leach slowly from the soil to the water table where they can persist. Some biodegradation of these chemicals can occur in ground water. Biodegradation in soil is generally slow (Verschueren, 1983; U.S. EPA, 1979; Howard, 1989). Toluene is more susceptible to biodegradation than the other chemicals in this group. Bioconcentration of this group of chemicals is not expected to be important (U.S. EPA, 1979; Howard, 1989).

Degradation of the monocyclic aromatic hydrocarbons is primarily a result of reaction with hydroxyl radicals in the atmosphere or hydro-oxydation and mineralization by bacteria and fungi found in soil and sediments. The products of hydro-oxydation of these chemicals are phenolic compounds, and the ultimate products of mineralization are carbon dioxide, water and chloride ions.

Polycyclic Aromatic Hydrocarbons

The chemicals of potential concern at Skinner Landfill that are polycyclic aromatic hydrocarbons (PAHs) are listed in Table 3-1. PAHs tend to adsorb strongly to soil particulates and have low aqueous solubilities and mobility in the soil. Most PAHs are not volatile; the exceptions are naphthalene and related compounds, which are somewhat volatile. PAHs have low water solubility and their solubility decreases as the molecular weight increases. PAHs have slow degradation rates in ground water. PAHs are rapidly degraded by photolysis in surface water. Biodegradation and biotransformation are the ultimate fate process removing PAHs from soil and sediment. The lower molecular weight PAHs, such as naphthalene, can be biodegraded fairly rapidly. PAHs tend to be transported in the particulate phase because they adsorb strongly to soils and sediments. Naphthalene is more soluble than most PAHs and can be transported in a dissolved phase. Some PAHs bioconcentrate; however, they are also metabolized by many organisms.

Phthalate Esters

Chemicals of potential concern that are phthalate esters are listed in Table 3-1. These chemicals are common laboratory contaminants (U.S. EPA, 1989a). Phthalate esters generally have very low vapor pressure and Henry's Law constants and are not volatile. Phthalates tend to adsorb strongly to soils and sediments, and sorption is a dominant fate process (U.S. EPA, 1979; Howard, 1989). These chemicals do not tend to leach to the ground water, but tend to remain in the soil and be transported in the soil. Photolysis, oxidation, and hydrolysis are not considered as important fate mechanisms for phthalates (Howard, 1989). Phthalates may have high bioconcentration factors, but fish and many other aquatic organisms can metabolize some phthalates (Howard, 1989). There is little information on the ability of organisms to metabolize most of these chemicals.

Ketones

The ketones identified as chemicals of potential concern at the site are listed in Table 3-1. Ketones have high water solubilities and high vapor pressures. Volatilization of ketones from water is limited because of their high water solubilities. Ketones can leach to ground water. Adsorption to soil and sediments is not a major fate process for ketones. Ketones are degraded in the atmosphere by photolysis and reaction with hydroxyl radicals and do not persist in the environment (Howard, 1989). Ketones are not bioaccumulative.

Pesticides and PCBs

The pesticides and PCBs identified as chemicals of potential concern at the site are listed in Table 3-1.

PCBs are a family of compounds which vary widely in physical, chemical, and biological properties. For those PCBs with four or fewer chlorine atoms per molecule, biodegradation seems to be the dominant fate process and results in significant destruction and transformation. PCBs with five or more chlorine atoms per molecule may be degraded by photolysis in the environment. Processes that affect the distribution and transport of PCBs are adsorption, volatilization and bioaccumulation. The lower molecular weight PCBs have a greater tendency to volatilize than do the heavier PCB compounds. In surface water, most of the PCBs adsorb strongly to sediments due to their very low water solubility. The tendency of PCBs to adsorb increases with the degree of chlorination and with the organic content of the soil or sediment. PCBs are quite bioaccumulative. PCBs are quite persistent in the environment (U.S. EPA, 1979).

The pesticides on the list of chemicals of potential concern generally have properties similar to the PCBs.

Dioxins and Furans

Dioxins and furans (CDDs and CDFs) that are chemicals of potential concern at the site are listed in Table 3-1. The most widely studied and likely the most toxic chemical in this group is 2,3,7,8-TCDD. This discussion is based on 2,3,7,8-TCDD. This chemical is strongly sorbed to soils and sediments (U.S. EPA, 1979). The most important processes affecting the fate of this chemical in soil are vapor phase diffusion and photolysis at the surface. Biodegradation in the soil is not important, except over the long term. Leaching of 2,3,7,8-TCDD from soil is very slow compared to volatilization and erosion. Many aquatic organisms, including fish, bioaccumulate CDDs and CDFs (U.S. EPA, 1988b). Some dioxins can be metabolized by fish (Kleeman, *et al*, 1986a; Kleeman *et al*, 1986b).

Other Organic Chemicals

Three other chemicals (benzoic acid, carbon disulfide, and benzyl alcohol) that do not fall into the above categories were identified as chemicals of potential concern.

Benzoic acid is used as a food preservative and occurs naturally in foods such as berries and in bark of some trees. It is also formed in combustion. Benzoic acid should readily biodegrade in surface water, and adsorption and volatilization are not important processes. Benzoic acid does not bioaccumulate. In the atmosphere, benzoic acid will be mostly associated with aerosols and it will be subject to gravitational settling or scavenging by rain. Benzoic acid biodegrades in ground water. It does not adsorb to soil and tends to leach. Biodegradation products are methane and carbon dioxide. (Howard, 1989.)

Carbon disulfide is a natural product of anaerobic biodegradation. If released on land, carbon disulfide will be primarily lost by volatilization. It may also readily leach to the ground water, where it will slowly biodegrade. If released to surface water, carbon disulfide will be primarily lost by volatilization. Adsorption to sediment and bioconcentration in fish should not be significant. Carbon disulfide degrades in the atmosphere by reacting with oxygen and hydroxyl radicals. (Howard, 1990.)

Little information is available on the environmental fate of benzyl alcohol. Benzyl alcohol is fairly volatile and will tend to volatilize from surface water and the soil surface. It is also quite water soluble, and so will tend to be transported by surface water or ground water. Benzyl alcohol probably biodegrades readily.

Section 5.0 of the Remedial Investigation presents further information on fate and transport. Information on properties of chemical groups that affect their fate and transport are presented below.

3.3.3 Exposure Routes and Exposure Points

Exposure routes are the ways that chemicals may come into contact with an organism. They include ingestion, inhalation, and dermal contact. Exposure points are locations of potential contact between an organism and a chemical. Table 3-2 lists all potential exposure routes and characterizes the applicability of each potential route to each potentially exposed population, given current land use at the site. Table 3-3 lists the potentially complete exposure routes in a hypothetical future situation involving residential development of the site and characterizes the applicability of each route to each population. This situation is postulated for purposes of assessing the potential risks under a reasonable maximum exposure (RME) scenario. The reasonable maximum exposure (RME) is defined as the highest exposure that is reasonably expected to occur at the site (U.S. EPA, 1989a). The rationale for the characterization and applicability of each exposure route is described in the following sections.

3.3.3.1 Soil Exposure

Exposure to any soil on the Skinner property may present a potential route of exposure to contaminants. Exposure to contaminants in soils may occur through direct dermal contact and/or incidental ingestion of affected soils.

Current Land Use

The Skinner residences are located on the west side of the property. Approximately 13 residences surround the landfill to the south and west and an elementary school with 780 students is located to the west of the property across Highway 42 (Figure 1). A residential area is located approximately 0.5 miles east of the site and is separated from the property by a railroad and wooded area. The property north of the landfill property is non-residential and vacant. Because of the residential setting and the unrestricted boundary of the Skinner property, both adults and children could be exposed to affected soils when crossing the site.

Future Land Use

It is unlikely that the waste lagoon area would ever be developed residentially because this area is a former active landfill. However, it was assumed that all portions of the site could be developed residentially in the future and that the soils in this area could be excavated and brought to the surface where people could be directly exposed to any excavated soils. It was also assumed that the hypothetical future residential development of the site would not preclude its use by an occupational population.

3.3.3.2 Ground Water Exposure

Exposure to ground water contaminants could occur through use of ground water as a drinking water supply, as well as through inhalation and dermal contact while showering.

Current Land Use

Two residential wells are located on the site. These wells present a potential for exposure to the populations using those wells for drinking water supply and for showering.

Future Land Use

If the site were developed for residential use, it is possible that a well water supply for drinking and showering could be installed anywhere on the site. Under this circumstance, long-term exposure of residential populations could occur. It has been assumed in this assessment that wells could be installed anywhere on the site except directly over the buried lagoon.

3.3.3.3 Air Exposure

Air is a potential exposure route at the Skinner property. Individuals may be exposed to chemicals of concern in air that have volatilized from impacted soils or through exposure to contaminated fugitive dust. However, the soils of concern are at depths at which volatilization is highly unlikely to occur. Additionally, vegetation and ground cover at several locations on the site prevent significant fugitive dust emissions. For these reasons, and due to budgetary constraints, air exposure has not been quantified for the Skinner landfill site. While current exposures are unlikely to differ significantly from the estimates provided in the sections that follow, future exposures at the site (which may include partial excavation of deeper soils) may be underestimated as a result of the elimination of the air exposure pathway. This will be discussed further in Section 3.7, Uncertainty and Assumptions. Fugitive dust emissions and volatilization of chemicals would provide a potential for inhalation exposures if excavation occurred on the site.

3.3.3.4 Surface Water and Sediment Exposure

Surface water on the Skinner property includes Skinner Creek, Dump Creek (which is very small and intermittent), the East Fork of Mill Creek and a series of ponds. Swimming and wading are potential exposure routes for any current or future population. Surface water and sediments are potential points of exposure to contaminants for current and future populations.

3.3.3.5 Food Exposure

Fish are not likely to be contaminated as the chemicals of concern found in streams are not bioaccumulative. Some of the chemicals of concern in ponds may bioconcentrate in aquatic organisms, but it is unlikely that these artificial ponds support a significant sustained fishery. Wildlife and/or game animals are not likely to be extensively contaminated because the size of the site is quite small relative to the surrounding area which also provides suitable habitat. The site does provide good habitat for a small number of wildlife, and individual animals that inhabit the site could be exposed to contaminants. Persons who consume these animals could also be exposed. No livestock (except for a horse) are raised or edible plants cultivated on site. Exposure via consumption of contaminated wildlife is possible, but is likely to be small and has not been quantitatively evaluated.

3.3.3.6 Multiple Exposure Pathways and Cumulative Risks

A given population may be exposed to a number of chemicals from several exposure routes. For example, children may be exposed to contaminants through dermal contact with soils as well as to chemicals present in drinking water from the impacted aquifer. Therefore, it is necessary to evaluate the total exposures of an individual or a population that may occur. Section 5.0 addresses this issue quantitatively.

3.4 SUMMARY OF EXPOSURE ROUTES, EXPOSURE POINTS, AND POTENTIALLY EXPOSED POPULATIONS

Tables 3-2 and 3-3 summarize the relevant exposure pathways and susceptible populations for the Skinner Landfill site for current and potential future land uses. These tables summarize the potentially exposed populations; the exposure media, routes, and points; and the reasons for selecting or excluding each exposure pathway.

If the site were developed for residential use in the future there would be exposure of residential populations to affected media but occupational exposures may not be eliminated. Exposure of recreational populations could continue if residential development occurred, but this exposure would be much less than the potential residential exposures.

Table 3-4 summarizes the potential exposure routes and potentially exposed populations. The complete exposure pathways under the **current** land use situation are:

- Occupational populations (adults only) may be exposed to affected soil, air, ground water, surface water, sediments, and food (game animals). Exposures would not be lifetime exposures.

- Residential populations (children and adults) may be exposed to affected soil, air, ground water, surface water, sediments, and food (game animals). There is potential for lifetime exposure.

- Recreational populations (children and adults) may be exposed to affected soil, air, ground water, surface water, sediments, and food (game animals). There is potential for lifetime exposures.

Current exposures to chemicals of concern in air and food are probably small in relation to other exposures and were not quantified.

The complete exposure pathways if the site were developed for residential use in the future are:

- Occupational populations (adults only) may be exposed to affected soil, ground water, surface water, sediments, air and food (game animals). Occupational exposures would not be lifetime exposures.

- Residential populations (children and adults) may be exposed to affected soil, ground water, surface water, sediments, air and food (game animals). There is potential for lifetime exposures.

- Recreational populations (children and adults) may be exposed to affected soil, ground water, surface water, sediments, air, and food (game animals). There is potential for lifetime exposure.

Potential future exposures to chemicals of concern in air and food are probably small in relation to other exposures and were not quantified.

3.5 EXPOSURE CONCENTRATIONS

Exposure concentrations for soil, surface water, and sediments were estimated as the upper 95% confidence limit for the arithmetic means of the data, assuming the data have a lognormal distribution. The method used to calculate the upper 95% confidence limit is presented in Appendix D. If the upper 95% confidence limit for the mean exceeded the maximum concentration, the maximum concentration was used as the exposure concentration. Half of the average sample quantitation limits were used as proxy values for data reported below the SQL. Exposure concentrations for ground water were set at the maximum detected concentration. The maximum value was used because exposure to ground water occurs at a single point (from a single well); therefore, spatial averaging was not appropriate. Potential future concentrations in the East Fork of Mill Creek were estimated based on the upper 95% confidence limits for the arithmetic mean concentrations in the wells in the area where ground water discharges to the creek. The upper 95% confidence limit for the arithmetic mean concentration was used to estimate loads to the creek because ground water flow to the creek occurs along approximately 1,500 feet of the creek rather than from a single point. It was assumed that the concentrations of contaminants in soils remain constant over time.

The air and food exposure pathways were evaluated qualitatively in this assessment, and exposure concentrations were not estimated for these media.

3.5.1 SOIL

Two soil areas were identified based on the differing concentrations present. Soils from the waste lagoon were separated from remaining site-wide soil samples. This separation was made based on knowledge of prior disposal practices and information collected during sampling activities, which pointed to the waste lagoon area as potentially high in contaminant concentrations. Both of the areas (waste lagoon and remaining site-wide soils) were evaluated similarly in terms of the current and future scenarios described below. It was assumed that the soil concentrations remain constant over time. Potential risks from exposure to waste lagoon and site-wide soils are considered in the risk characterization (Section 5.0).

Current Land Use

The upper 95% confidence limit for the arithmetic mean of surficial soil concentrations for each chemical of concern was used to assess the potential exposure of residential and recreational populations in the current land use situation. These values were calculated with an assumption that the concentrations below the SQL were equal to half of the sample quantitation limit. Soil concentrations used in the exposure assessment for both areas are presented in Tables 3-5 and 3-6.

Future Land Use

Future exposures to waste lagoon soils were modeled under two scenarios: 1) assuming future residential development and 2) assuming no future residential development. Under the first scenario, the upper 95% confidence limits for the arithmetic mean concentrations present in all waste lagoon soils were used to assess the potential exposure of all populations to waste lagoon soils. All soils sampled in the waste lagoon were used in this scenario because it was assumed that these soils could be excavated under future residential development. Under the second scenario exposure concentrations used to assess potential exposure to waste lagoon soils were based on surface soils only. Because only two surface samples were available for waste lagoon soils, the upper 95% confidence limits for the arithmetic mean concentrations could not be calculated. Therefore, the maximum observed concentration for each chemical of concern was used to assess future exposure.

Tables 3-5 and 3-6 present the exposure concentrations in soil for each chemical of concern for the future use scenarios.

3.5.2 GROUND WATER

3.5.2.1 Exposure through Ingestion

Current Land Use

The maximum ground water concentration for each chemical of concern in residential wells was used to assess the exposure of existing residential populations. Table 3-7 presents the exposure concentrations for ground water.

Future Land Use

The maximum ground water concentration for each chemical of concern in all wells (residential and monitoring wells) was used to assess the potential exposure of residential populations that could occur if the site were redeveloped with residences and drinking water wells were installed. It was assumed that wells could be installed anywhere on the site except within the waste lagoon. Table 3-7 presents the exposure concentrations for each chemical.

3.5.2.2 Exposure through Showering

A shower model was used to estimate the concentrations of potential concern that may occur in air during and immediately after showering. This model is presented in Appendix E. The concentrations that could occur in shower air are based on the current maximum ground water concentrations in residential wells. The future concentrations that could occur in the shower air are based on maximum concentrations in ground water (using data from all residential and monitoring wells).

Table 3-7 presents the estimated concentrations of chemicals of potential concern that could occur in the shower and bathroom. These concentrations are weighted averages based on the assumption that a person will shower for 12 minutes (U.S. EPA, 1989a) and will spend an additional 10 minutes in the bathroom after the shower is over (Association of Ground Water Scientists and Engineers, 1989).

3.5.3 SURFACE WATER AND SEDIMENTS

The upper 95% confidence limits for the arithmetic mean concentrations found in surface water and sediments were used for the current exposure scenario. Future concentrations in surface water were assumed to be the same as current concentrations in all surface water bodies except for Mill Creek, as described below. The ponds and creeks were evaluated separately. Current and future sediment concentrations were assumed to be the same for all surface water bodies. Tables 3-8 and 3-9 present the exposure concentrations for surface water and sediments, respectively.

Potential future concentrations of the chemicals of potential concern in the East Fork of Mill Creek were estimated using a ground water model, which is presented in Appendix I, and a model of dilution in the East Fork of Mill Creek (Appendix F). The annual average flow of the creek (10.6 cfs) was used to estimate dilution in the creek. The annual average flow was derived from U.S. Geological Survey data. The estimated future concentration of chemicals of potential concern in the East Fork of Mill Creek are presented in Table 3-8.

3.5.4 GROUPING OF CHEMICALS

As outlined in Section 5.9.2 of the Human Health Evaluation Manual (U.S. EPA, 1989a), the baseline risk assessment group some chemicals by class. In this assessment, three classes of chemicals were grouped: the dioxins and furans; the polynuclear aromatic hydrocarbons (PAHs); and PCBs.

The chlorinated dibenzo-p-dioxins and dibenzofurans (CDDs and CDFs) detected were evaluated using toxicity equivalency factors developed by the U.S. EPA. All dioxins detected at the site were expressed as equivalent amounts of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The method used to convert concentrations of CDDs and CDFs to equivalent amounts of 2,3,7,8-TCDD are presented in Appendix C.

Several PAHs were detected on the site. However, there is very little toxicological information available to assess the health risks associated with exposure to these chemicals. Therefore, the following PAHs were grouped together and toxicological information for benzo(a)pyrene was used to assess the health risks associated with human exposure to them:

Acenaphthylene
Benzo(a)Anthracene
Benzo(b)Fluoranthene
Benzo(k)Fluoranthene
Indeno(1,2,3-cd)Pyrene
Dibenzo(a,h)Anthracene
Benzo(g,h,i)Perylene
Chrysene

These PAHs are all considered to be potential carcinogens.

PCB Aroclors 1254 and 1260 were detected on site. These compounds were grouped together and were evaluated using toxicity information from the U.S. EPA IRIS (Integrated Risk Information System) database (U.S. EPA, 1989b) for the general category of PCBs.

Additionally, toxicity information for total chlordane was used for alpha-chlordane and gamma-chlordane due to the structural similarity of the chemicals (see Section 4.3.1). Two other chemicals, total chromium and total 1,2-dichloroethene, were evaluated based on the toxicity values for the most toxic form or isomer, chromium VI and cis-1,2-dichloroethene, respectively.

These classes of chemicals were evaluated using the same exposure assumptions used for all other chemicals detected on the site.

3.6 ESTIMATION OF CHEMICAL INTAKES

This section describes the methods for calculating chemical specific intakes for the populations and exposure pathways selected for quantitative evaluation. The general form of the intake equations includes terms for the concentration of the chemical in the appropriate medium, the amount of contaminated medium contacted by a person per unit time or event, the frequency and duration of the exposure, the body weight of the exposed person, and the time over which the exposure is averaged. The intakes calculated using the intake equations are usually expressed as the amount of chemical at the exchange boundary (e.g., skin, lungs, gut) and available for absorption. Intake, therefore, is not equivalent to absorbed dose, which is the amount of a chemical absorbed into the blood stream. These equations are only estimates of potential intakes and do not calculate the actual intake that may occur. Conservative simplifying assumptions, are used to assure that the actual intakes that occur are probably less than the estimated intakes and are unlikely to be greater than the estimated intakes.

The U. S. EPA has made a policy decision to use, wherever appropriate, standardized assumptions, equations, and parameter values in evaluations of risks to human health. This approach expedites preparation and review of risk assessments and provides for more consistent evaluations of risks at different sites. This risk assessment uses standard assumptions, equations and parameter values when these are available. The most important standard assumption is that the site will someday be redeveloped for residential purposes and that ground water will be used as a drinking water source. Conservative estimates of parameter values were made in the absence of standard values. If there was little or no basis for even a conservative estimate of a parameter value, best professional judgement was used to obtain an appropriate estimate.

The following sections describe the standard equations for estimating human intakes for all complete exposure pathways at the site. The equations are found in Appendix G. The exposure concentrations, discussed in Section 3.5, are summarized in Tables 3-5 through 3-9. Table 3-10 provides the constants and variables used in the intake equations. The basis for these values is discussed below.

Several assumptions were made that apply to each intake equation for residential and recreational populations. Adults were assumed to weigh 70 kg and children were assumed to weigh 15.1 kg. These body weights are the standard weights assumed in risk assessment (U.S. EPA, 1990b). Long term exposures to carcinogens and non-carcinogens for adults was assumed to occur for 30 years (U.S. EPA, 1989a). Six years was selected as a short-term exposure duration for children (U.S. EPA, 1990b). The averaging time for children's exposure to non-carcinogens was 2190 days (6 years times 365 days per year). For exposure to non-carcinogens, the averaging time for adults was assumed to be 10,950 days (30 years times 365 days). The averaging time for adults and children's exposure to carcinogens was assumed to be 25,550 days (70 years times 365 days per year). It was also assumed that occupational and recreational populations would live off-site and would travel to the site for work or recreational purposes. This assumption was made because occupational and recreational exposure events were included in the resident's exposures (i.e., swimming events, etc.).

Assumptions used consistently in the adult occupational intake equations were 70 kg body weight, 47 year exposure duration to non-carcinogens and carcinogens (site-specific estimate), and averaging times of 17,155 days for non-carcinogens (47 years times 365 days per year) and 25,550 days for carcinogens (70 years times 365 days per year) (U.S. EPA, 1990b).

3.6.1 ESTIMATED INTAKES OF CHEMICALS IN SOIL

Equation 1 (Appendix G) was used to estimate the intakes of chemicals due to ingestion of soils at the site. Occupational adults were estimated to ingest 50 mg of soil/work day (U.S. EPA, 1990b). Residential adults were assumed to ingest 100 mg of soil per day, while children were assumed to ingest 200 mg/day (U.S. EPA, 1989a). Assuming that the recreational population was on the site for one hour each day, ingestion rates were calculated for this population by converting the standard soil ingestion rates for adults and children to hourly rates by dividing the daily ingestion rate by 16 waking hours per day. Using these assumptions, the ingestion rates for recreational populations were estimated to be 12.5 mg/day for children (200 mg/day divided by 16 waking hours/day) and 6.3 mg/day for adults (100 mg/day divided by 16 waking hours/day) The fraction of soil ingested from the contaminated sources was conservatively estimated to be 100% for each of the exposed populations. The concentrations of the contaminants in soil used for each exposure scenario are presented in Tables 3-5 and 3-6. These concentrations were used to estimate the intakes under the current and future land use scenarios for soil ingestion.

The exposure frequency and duration for ingestion of soil were based on the assumptions concerning the amount of time spent at home, in the occupational setting, and recreating. It was assumed that current and future residential and recreational populations (adults and children) spend 365 days a year at the site (U.S. EPA, 1990b). Occupational exposures were estimated to occur 250 days per year, which equates to 50 5-day work weeks (allowing for holidays, vacations, etc.) per year (U.S. EPA, 1990b). Residential and recreational scenarios used exposure durations of 6 years for children. For adults, the exposure duration was estimated at 30 years for non-carcinogens and carcinogens. The exposure duration for the occupational population was assumed to be 47 years, or the number of years worked between ages 18 and 65.

Equation 2 (Appendix G) was used to estimate the potential intake of chemicals due to dermal contact with chemicals in the soils at the site. This equation estimates an absorbed dose, not the amount contacted, and differs from the other intake equations in this regard. The soil concentrations used to estimate intakes due to contact with the soil are otherwise the same as those used to estimate intake due to ingestion of soil.

The skin to soil adherence factor was assumed to be 2.11 mg/cm^2 for all exposed populations (Ohio EPA, 1991). The dermal absorption efficiencies used in this equation were 25% for volatile organics; 10% for semi-volatile organics; and 1% for inorganics (Ryan, *et al.*, 1987). Standard assumption values were used to estimate skin surface area for arms, hands, and legs. For adults this value was assumed to be 8,260 cm^2; for children, 3,535 cm^2 (Ohio EPA, 1991). The skin surface area for the adult occupational population (3,120 cm^2) was determined by assuming that exposure was limited to arms and hands (U.S. EPA, 1989a). The exposure frequencies and durations used for estimating dermal contact with soils were the same as those used for estimating soil ingestion.

Table 3-10 summarizes the constants and variables used in Equations 1 and 2 (Appendix G). Tables 3-11 through 3-22 present the estimated intakes resulting from ingestion of and/or dermal contact with soils in each soil area (waste lagoon and site-wide soils).

3.6.2 ESTIMATED INTAKES OF CHEMICALS IN GROUND WATER

Intake of chemicals in ground water may occur via ingestion or dermal contact with ground water while showering. Inhalation of chemicals that volatilize from ground water may also occur during showering. These intakes are considered in this section.

Equation 3 (Appendix G) was used to estimate potential ground water intake through ingestion. The average concentrations of the contaminants in ground water are presented in Table 3-7. Tables 3-23 through 3-28 present the estimated intakes of chemicals resulting from exposures to ground water.

Children from the current and potential future residential populations were assumed to ingest 1 liter of water a day (U.S. EPA, 1989c). Residential adults were assumed to ingest 2 liters of water a day, and occupational adults to ingest 1 liter of water each work day (U.S. EPA, 1990b). The exposure frequency was assumed to be 365 days per year for residents and 250 days per year for occupational adults. Other populations are unlikely to be exposed to chemicals in the ground water. Table 3-10 presents the values of each parameter used in Equation 3.

Intakes of chemicals during showering may occur via dermal contact. Equation 4 was used to estimate these intakes. Table 3-10 presents the value of each parameter used in this equation. The concentrations of the chemicals of potential concern were set to the upper 95% confidence limit of the arithmetic mean of the data for each chemical (see Table 3-7. The skin surface areas were set to 7280 cm^2 for children and 19,400 cm^2 for adults. These are the average skin surface areas for boys aged 3 to 6 years for children and for men, respectively. The exposure time for showering was set to 0.2 hours/event (U.S. EPA, 1989a). The exposure frequency was assumed to be 365 days/year, (U.S. EPA, 1989c).

Based on information received by Region V U.S. EPA from the Environmental Criteria and Assessment Office (ECAO, 1990), the following dermal permeability constants were recommended: 2.1 x 10^{-3} cm/hr for chromium (Baranowska-Dutkiewicz, 1981), 1.11 x 10^{-1} cm/hr for benzene (Blank and McAuliffe, 1985), 1.01 cm/hr for toluene (Baranowska-Dutkiewicz, 1982), and 5.0 x 10^{-3} cm/hr for 2-butanone (Blank, *et al.*, 1967). The following dermal permeability constants were also recommended: 0.1 cm/hr. for ethylbenzene and toluene and 0.00016 cm/hr for hexachlorobenzene (U.S. EPA, 1991). For those chemicals without dermal permeability constants, it was recommended that the value for water (1.5×10^{-3} cm/hr. Bronaugh, *et al.* 1986) be used as a default value for inorganics and the value for toluene (1.01 cm/hr) be used as the default value for volatile organics (ECAO, 1990). The value for water was also used as the default value for semi-volatile organics.

Equation 5 was used to estimate the intake of chemicals via inhalation that volatilize during showering. The concentrations of chemicals in air were estimated by the shower model (Appendix E). These are weighted average concentrations to account for 12 minutes spent in the shower and 10 additional minutes spent in the bathroom (Association of Ground Water Scientists and Engineers, 1989). Inhalation will occur during the 22 total minutes spent in the bathroom, whereas dermal contact will only occur during the 12 minutes spent in the shower. The respirable fraction was assumed to be 100%. The inhalation rate was assumed to be 0.6 m^3/hour (U.S. EPA, 1989a). The exposure time was assumed to be 0.37 hours/event (22 minutes). Exposure duration was assumed to be 365 days/year, U.S. EPA, 1989c). The values of each parameter used in this intake equation are presented in Table 3-10.

3.6.3 Estimated Intakes of Chemicals in Surface Water

Intake of chemicals in surface water may result from two exposure routes: ingestion of chemicals in surface water and dermal contact with chemicals in surface water while swimming or wading. The intakes are based on concentrations of chemicals in unfiltered surface water samples (Table 3-8) for estimating intakes from both routes.

Equation 6 (Appendix G) was used to estimate the intakes of chemicals due to ingestion of surface water that may occur during swimming or wading. The standard exposure assumption for the ingestion rate (50 ml/hour) from U. S. EPA (1988a) was used. The exposure time was assumed to be 2.6 hours/event, (U.S. EPA, 1988a). The standard assumption for exposure frequency (7 days/year) from U. S. EPA (1989a) was used for adults and children for current and future residential and recreational exposures. Standard values were used for the other parameters. Table 3-10 presents the values of each parameter.

Equation 4 (Appendix G) was used to estimate the intakes of chemicals due to dermal exposure to chemicals in surface water. The concentrations of chemicals in unfiltered surface water samples were used (Table 3-8). Total skin surface areas of males were used (7,280 cm^2 for children and 19,400 cm^2 for adults; U.S. EPA, 1989a). Dermal permeability constants were the same as those used in the equation for dermal contact with ground water while showering (Section 3.6.2). The exposure time was assumed to be 2.6 hours/day (U.S. EPA, 1988a), which is consistent with the exposure time used for the ingestion of chemicals while swimming. The standard assumption for exposure frequency (7 days/year) from U. S. EPA (1989a) was used for adults and children for residential and recreational populations. Standard assumptions were used for body weights, exposure durations, and averaging times. Tables 3-29 through 3-40 present the intakes of chemicals through ingestion of and/or dermal contact with surface water.

3.6.4 ESTIMATED INTAKES OF CHEMICALS IN SEDIMENTS

Intake of chemicals in sediments may result for two exposure routes: ingestion of chemicals in sediments and dermal contact with chemicals in sediments while swimming or wading. The intakes are based on concentrations of chemicals in the sediments (Table 3-9). Equations 1 and 2 (Appendix G) were used to estimate intake of chemicals in sediments; these are the same equations used to estimate soil intakes.

The sediment ingestion rates were estimated by converting the standard soil ingestion rates for children and adults (mg/day) to rates per event because exposure to the sediments will only occur during swimming while exposure to soils could occur throughout the day. The resulting ingestion rates are 22 mg/event for children (200 mg/day divided by 24 hours/day times 2.6 hours per event) and 11 mg/event for adults (100 mg/day divided by 24 hours/day times 2.6 hours per event).

Best professional judgement was used to estimate the fraction of sediments that would be ingested from the contaminated source. For both adults and children it was assumed that 100 percent of the ingested sediment would be from the contaminated area. The exposure frequencies were assumed to be the same as used for dermal contact with chemicals in surface water (7 days/year). Standard exposure durations, body weights and averaging times were assumed. Table 3-10 presents the values of each parameter used to estimate intake of chemicals of concern via ingestion of sediments.

Intakes due to dermal contact with chemicals of concern in sediments were estimated using Equation 2. Average sediment concentrations were used (Table 3-9). The skin surface area that would come into contact with the sediments was assumed to be that of the legs, arms, and hands. For children this value was estimated to be 3,535 cm^2; for adults 8,620 cm^2 (males, U.S. EPA, 1989a) Absorption factors were estimated to be 25% for volatile organics, 10% for semi-volatile organics and 1% for inorganics (Ryan, *et al*, 1987). The soil standard soil adherence factor for clay of 2.11 mg/cm^2 was used (Ohio EPA, 1991). The exposure frequencies were assumed to be the same as for swimming (7 days/year). Standard assumptions were used for exposure duration, body weights, and averaging times. Tables 3-41 through 3-52 present the estimated intakes of chemicals of concern through ingestion of and/or dermal contact with sediments.

3.7 UNCERTAINTY AND ASSUMPTIONS

3.7.1 SUMMARY OF RANGES OF VALUES

Table 3-53 summarizes the uncertainty of all parameters used in the intake equations. Several rationales were followed to establish the values used in the intake equations, including the use of values recommended by the U.S. EPA, standard assumptions, best professional judgement, and conservative estimations.

Values recommended by the U.S. EPA were used when available and applicable. These values were typically standard assumptions used for body weights, lifetime exposure durations, averaging times, surface water ingestion rates, swimming events, swimming duration, and ground water ingestion rates. These standard assumptions are conservative and may overestimate exposures.

Permeability constants and absorption factors are chemical-specific values which are unavailable for most of the chemicals at the Skinner Landfill site. The few chemical-specific permeability constants received from U.S. EPA Region V for chemicals at the site are based on very limited information (single case studies of unknown quality) which is a major point of uncertainty in these values. Chemicals with unknown permeability constants were assigned default values (Ryan, et al., 1987). Volatile organics, semi-volatile organics and inorganics were assigned the default absorption factors of 25%, 10%, and 1%, respectively. These default values are not chemical-specific and do not represent the actual properties of individual chemicals. The use of these default values in the intake equations may result in an underestimate or, more likely, an overestimate of the actual intake of these chemicals through skin.

Best professional judgement was used to estimate many of the parameters used in this assessment. The exposure durations and averaging times for children and the occupational population, the fraction of total soil and sediments ingested that were ingested from the site, soil and sediment ingestion rates for recreational populations, and the fraction of chemicals respirable during showering were all estimated based on professional judgement. These assumptions were designed to be conservative and may overestimate exposures. The methods used to determine these parameters are presented in Section 3.6.

The rationales for the concentrations of chemicals of concern that were used are explained in Section 3.5. The rationales for the use of selected values for other parameters are detailed in Section 3.6.

3.7.2 ASSUMPTIONS OF EXPOSURE ASSESSMENT

Several assumptions used in estimating chemical intakes contribute to the overall uncertainty in assessing potential risks associated with exposures at the Skinner landfill. Table 3-54 summarizes the approximate magnitude of uncertainty in terms of the potential for over- or under-estimation of chemical intakes.

In general, most of the uncertainties associated with exposure assumptions will tend to cause over-estimates of the actual intakes. Many of the parameters are taken from U.S. EPA guidance documents; others have been developed based on best professional judgement or conservative assumptions. Those developed using best professional judgement are designed to over-estimate the intakes. For example, the assumption that children and adults in the recreational population will swim in on-site ponds and creeks 7 times annually may over-estimate the frequency of on-site swimming events. With a limited summer season of approximately 12 weeks (June through August), this assumes persons would swim on-site nearly once every summer week. The proximity of other inland lakes and streams, which may be more suited to recreational swimming, likely precludes the frequency of on-site swimming events assumed here.

The exclusion of air modeling or fugitive emissions information to develop potential intakes through inhalation presents some uncertainty in the exposure assessment.

However, several factors associated with conditions at the site indicate that air exposures may not contribute significantly to intakes of chemicals of concern for any potentially exposed population. The concentrations of volatile chemicals found in upper soil strata are relatively low; those found at lower depths are not readily available for volatilization. The area most heavily impacted (waste lagoon) does support vegetation which would serve to reduce fugitive emissions. Further, other studies have shown that air emissions tend to contribute significantly less to the overall intakes of chemicals than do other pathways, especially ingestion of ground water, dermal contact with soils and surface water, and incidental ingestion of soils. While the development of the site for residential use in the future may require at least partial excavation, this activity is not expected to contribute significantly to the overall intakes of chemicals in this scenario. Nevertheless, the omission of the inhalation pathway does produce some uncertainty in this assessment and must be considered when remedial strategies are developed.

Exposure of people to chemicals of concern that may be present in game, domestic animals, or edible wild or cultivated plants has not been quantified. No vegetable gardens, fruit gardens, or edible livestock were observed on the site, so significant exposure via these routes is not occurring at present. Such exposures could occur in the future, which adds to uncertainty of the exposure assessment. Exposure to chemicals of concern in game animals is possible at present, although any such exposure route is likely to be minor. Chemicals detected in the creeks have low potential for bioaccumulation , so this exposure route is also likely to be minor. The ponds may be used for sport fishing in the future, and there is potential for bioaccumulation of some chemicals that occur in sediments of these ponds should they ever be used for fishing.

The large quantity and widespread distribution of soil, ground water, and surface water samples taken at the site reduces the potential for uncertainties arising from inadequate data. However, only two surface soil samples from the waste lagoon were available for calculation of exposure concentrations. The upper 95% confidence limit for the arithmetic mean concentration surficial in waste lagoon soils could not be calculated based on two samples. The maximum observed concentration was used instead. These exposure concentrations are highly uncertain because they may not be representative of actual concentrations. No special analytical problems were encountered, so the potential for over- or under-estimation of concentrations and intakes is low due to errors in chemical analyses.

There is some uncertainty inherent in the procedures used (as described in Section 2.0) to group some chemicals of concern. In general the procedures used were conservative and will tend to overestimate the actual exposures.

3.8 SUMMARY OF EXPOSURE ASSESSMENT

Wastes were disposed of in abandoned gravel excavations and soils. The potential migration pathways are leaching of materials from soils to ground water, movement of contaminated ground water to surface water and sediments, and volatilization of chemicals to air.

Potential routes of exposure include ingestion of and direct contact with impacted soils, ingestion of impacted ground water; ingestion of and direct contact with surface water and sediments; inhalation; and ingestion of impacted food. The inhalation exposure pathway and the food ingestion pathway were not evaluated quantitatively for the site. The exposure points are the site and nearby residences.

The current potentially exposed populations are workers at the site, residents living on and near the site, and persons who may recreate in the area. The primary future potentially exposed population is residential, as it has been assumed that the site could be developed for residential purposes. The future use scenario developed for the site also includes occupational and recreational populations. Recreational populations are assumed to live off-site in both current and future populations. The residential and recreational populations include subpopulations of adults and children; the occupational population consists only of adults.

Exposure concentrations were based on measured concentrations of chemicals of concern in the soil, ground water, surface water, and sediments. Concentrations of chemicals of concern in air were not quantified. Surficial soil concentrations of chemicals of concern were used to calculate the current exposures for all populations. Overall soil concentrations of chemicals of concern were used to calculate the future exposures for all populations under the scenario in which future residential development over the entire site is considered. Surficial soil concentrations were used to calculate exposures of all populations to waste lagoon soils under the scenario in which residential development on the waste lagoon was not considered. Exposure concentrations for soils were calculated as the upper 95% confidence limits for the arithmetic mean concentrations observed for both current and future exposures to soils. Current and future exposure concentrations for waste lagoon soils (under the no-residential development scenario) were set at the maximum observed concentrations. Maximum ground water concentrations of chemicals of concern were used to estimate the exposure of all current and future populations. Upper 95% confidence limits for the arithmetic mean concentrations of chemicals of concern were used to estimate the exposure of all current and future populations to surface water and sediments.

Three classes of compounds were grouped and evaluated using toxicity information for one of the known constituents. These classes include the dibenzo-p-dioxins and dibenzofurans; several carcinogenic polynuclear aromatic hydrocarbons, and PCB Aroclors 1254 and 1260. The dioxins and dibenzofurans were evaluated using a toxicity equivalency factor developed by Bellin and Barnes (1989) which allows for the expression of each compound as an equivalent of 2,3,7,8-TCDD. The PAHs, many of which have no toxicological information, were evaluated using toxicity information for benzo(a)pyrene, a known human carcinogen. Three PCB Aroclors (1248, 1254 and 1260) were grouped together and evaluated using toxicity information on PCBs obtained from the U.S. EPA IRIS database. Toxicity information for total chlordane was used for alpha- and gamma-chlordane due to the structural similarity of the chemicals.

Intake equations from the Human Health Evaluation Manual (U.S. EPA, 1989a) were used to estimate potential chemical intakes by the exposed populations. Standard exposure assumptions, conservative estimates, and best professional judgement were used to estimate parameters used in these equations.

Major sources of uncertainty are the exclusion of certain pathways (air and food ingestion) from quantitative analysis, the estimation of exposure parameters used in the intake equations, and assumptions regarding future use of the site.

Tables

TABLE 3-1
CHEMICALS OF POTENTIAL CONCERN
Skinner Landfill

CASRN	Chemical	CASRN	Chemical
Inorganic Chemicals			
7429-90-5	Aluminum	7439-92-1	Lead
7440-36-0	Antimony	7439-96-5	Manganese
7440-38-2	Arsenic	7439-97-6	Mercury, inorganic
7440-39-3	Barium	7440-02-0	Nickel, soluble salts
7440-41-7	Beryllium	7440-22-4	Silver
7440-43-9	Cadmium	7440-28-0	Thallium, soluble salts
7440-47-3	Chromium	7440-31-5	Tin
7440-48-4	Cobalt	7440-62-2	Vanadium
7440-50-8	Copper	7440-66-6	Zinc
57-12-5	Cyanide, free		
Chlorinated Aliphatic Hydrocarbons			
111-44-4	Bis(2-chloroethyl)ether	77-47-4	Hexachlorocyclopentadiene
39638-32-9	Bis(2-chloroisopropyl)ether	67-72-1	Hexachloroethane
56-23-5	Carbon tetrachloride	75-09-2	Methylene chloride
75-00-3	Chloroethane	706-78-5	Octachlorocyclopentene
67-66-3	Chloroform	79-34-5	1,1,2,2-Tetrachloroethane
75-34-3	1,1-Dichloroethane	127-18-4	Tetrachloroethylene
107-06-2	1,2-Dichloroethane	71-55-6	1,1,1-Trichloroethane
75-35-4	1,1-Dichloroethene	79-00-5	1,1,2-Trichloroethane
156-60-5	1,2-Dichloroethene	79-01-6	Trichloroethylene
78-87-5	1,2-Dichloropropane	75-01-4	Vinyl chloride
87-68-3	Hexachlorobutadiene		
Monocyclic Aromatic Hydrocarbons			
71-43-2	Benzene	95-48-7	2-Methylphenol
108-90-7	Chlorobenzene	106-44-5	4-Methylphenol
95-50-1	1,2-Dichlorobenzene	98-95-3	Nitrobenzene
541-73-1	1,3-Dichlorobenzene	87-86-5	Pentachlorophenol
106-46-7	1,4-Dichlorobenzene	108-95-2	Phenol
100-41-4	Ethylbenzene	108-88-3	Toluene
118-74-1	Hexachlorobenzene	1330-20-7	Xylenes, mixed

TABLE 3-1
CHEMICALS OF POTENTIAL CONCERN
Skinner Landfill

CASRN	Chemical		
Polycyclic Aromatic Hydrocarbons			
83-32-9	Acenaphthene	53-70-3	Dibenz(a,h)anthracene
208-96-8	Acenaphthylene	132-64-9	Dibenzofuran
120-12-7	Anthracene	206-44-0	Fluoranthene
56-55-3	Benzo(a)anthracene	86-73-7	Fluorene
205-99-2	Benzo(b)fluoranthene	193-39-5	Indeno(1,2,3-cd)pyrene
207-08-9	Benzo(k)fluoranthene	91-57-6	2-Methylnaphthalene
191-24-2	Benzo(g,h,i)perylene	91-20-3	Naphthalene
50-32-8	Benzo(a)pyrene	85-01-8	Phenanthrene
218-01-9	Chrysene	129-00-0	Pyrene
Phthalate Esters			
117-81-7	Bis(2-ethylhexyl)phthalate	131-11-3	Dimethyl phthalate
85-68-7	Butyl benzyl phthalate	84-74-2	Di-n-butylphthalate
84-66-2	Diethyl phthalate	117-84-0	Di-n-octyl phthalate
Ketones			
67-64-1	Acetone	591-78-6	2-Hexanone
78-93-3	2-Butanone (MEK)	108-10-1	4-Methyl-2-Pentanone
Pesticides and PCB's			
309-00-2	Aldrin	50-29-3	DDT
12672-29-6	Aroclor-1248	60-57-1	Dieldrin
11097-69-1	Aroclor-1254	72-20-8	Endrin
11096-82-5	Aroclor-1260	53494-70-5	Endrin ketone
57-74-9	Chlordane (alpha, gamma)	76-44-8	Heptachlor
3734-48-3	Chlordene	5202-36-8	Heptachloronorborene
72-54-8	DDD	319-85-7	beta-Hexachlorocyclohexane
72-55-9	DDE		
Chlorinated Dioxins and Furans			
1746-01-6	2,3,7,8-TCDD		Dioxin and Furan Toxicity Equivalents
Other Organic Chemicals			
65-85-0	Benzoic Acid	75-15-0	Carbon disulfide
100-51-6	Benzyl alcohol		

TABLE 3-2

SUMMARY OF COMPLETE EXPOSURE PATHWAYS FOR CURRENT LAND USE

Exposure Route, Medium and Exposure Point	Occupational Population: Pathway Selected	Occupational Population: Reason for Selection or Exclusion	Residential Population: Pathway Selected	Residential Population: Reason for Selection or Exclusion	Recreational Population: Pathway Selected	Recreational Population: Reason for Selection or Inclusion
Ingestion of and Dermal Contact with soil at site	Yes	Workers at site	Yes	Residential dwellings on site	Yes	Recreational use of site possible
Ingestion of ground water at the site	Yes	Well present at the site	Yes	Wells present at the site	No	No recreational well at the site
Dermal contact with and/or inhalation of ground water through showering	No	No showering by workers	Yes	Residences present at site	No	No showering by recreational users
Inhalation of vapor or particulates at site, workplace, or residences	Yes*	Dispersion of vapors to work areas	Yes*	Dispersion of vapors to residences	Yes*	Presence of vapors at or near site
Ingestion of or direct contact with surface water or sediments	Yes	Surface water and sediments impacted	Yes	Surface water and sediments impacted	Yes	Surface water and sediments impacted
Ingestion of food affected by site	Yes*	Ingestion of contaminated wildlife possible	yes*	Ingestion of contaminated wildlife possible	yes*	Ingeston of contaminated wildlife possible

* Only qualitative exposures evaluated.

TABLE 3-4

POTENTIAL EXPOSURE ROUTES AND EXPOSED POPULATIONS

Exposure Medium/	Occupational Population		Residential Population		Recreational Population	
Exposure Route	Current	Future	Current	Future	Current	Future
Soil						
Ingestion	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Dermal Contact	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Ground Water						
Ingestion	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Dermal contact (showering)	NE	NE	C,A,L	C,A,L	NE	NE
Inhalation (showering)	NE	NE	C,A,L	C,A,L	NE	NE
Air						
Inhalation of Vapor	NE	NE	NE	NE	NE	NE
Surface Water						
Ingestion	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Dermal Contact	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Sediments						
Ingestion	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Dermal Contact	A	A	C,A,L	C,A,L	C,A,L	C,A,L
Food						
Fish	NE	NE	NE	NE	NE	NE
Wildlife	NE	NE	NE	NE	NE	NE
Livestock and Milk	NE	NE	NE	NE	NE	NE
Plants	NE	NE	NE	NE	NE	NE

L = Potential lifetime exposure
C = Exposure of children may be significantly greater than of adults
A = Exposure to adults (highest exposure is likely to occur in occupational activities)
NE = Not evaluated quantitatively

TABLE 3-5
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM WASTE LAGOON SOILS
(mg/kg)

Chemical	Current	Basis	Future	Basis
Antimony	2.3 E+1	Maximum Detected	7.2 E+0	Upper 95% Confidence Limit
Cadmium	nd		1.5 E+0	Upper 95% Confidence Limit
Lead	1.4 E+2	Maximum Detected	1.3 E+2	Upper 95% Confidence Limit
Silver	nd		8.6 E-1	Upper 95% Confidence Limit
Thallium	nd		9.1 E-1	Upper 95% Confidence Limit
Tin	4.1 E+2	Maximum Detected	4.1 E+2	Maximum Detected
Cyanide	nd		1.6 E+0	Upper 95% Confidence Limit
Methylene Chloride	6.4 E-3	Maximum Detected	5.3 E+0	Maximum Detected
Acetone	1.4 E-2	Maximum Detected	1.4 E+2	Maximum Detected
Chloroform	nd		3.3 E+1	Maximum Detected
1,2-Dichloroethane	nd		2.1 E+2	Maximum Detected
2-Butanone	nd		3.9 E+1	Maximum Detected
1,1,1-Trichloroethane	nd		6.3 E+1	Maximum Detected
Carbon Tetrachloride	nd		1.6 E+2	Maximum Detected
1,2-Dichloropropane	nd		3.4 E+2	Maximum Detected
Trichloroethene	nd		1.4 E+2	Maximum Detected
1,1,2-Trichloroethane	nd		3.7 E+2	Maximum Detected
Benzene	nd		6.0 E+1	Maximum Detected
Tetrachloroethene	nd		4.4 E+1	Maximum Detected
1,1,2,2-Tetrachloroethane	nd		1.3 E+2	Maximum Detected
Toluene	3.8 E-3	Maximum Detected	3.1 E+4	Maximum Detected
Chlorobenzene	nd		1.5 E+1	Maximum Detected
Ethylbenzene	nd		9.8 E+1	Maximum Detected
Xylene (total)	nd		2.0 E+2	Maximum Detected
Phenol	nd		1.1 E+1	Upper 95% Confidence Limit
bis(2-Chloroethyl)Ether	nd		6.3 E+0	Upper 95% Confidence Limit
1,3-Dichlorobenzene	nd		2.2 E+1	Upper 95% Confidence Limit
1,4-Dichlorobenzene	nd		1.9 E+1	Upper 95% Confidence Limit
Benzyl Alcohol	nd		8.6 E+0	Upper 95% Confidence Limit
1,2-Dichlorobenzene	nd		1.2 E+1	Upper 95% Confidence Limit
2-Methylphenol	nd		7.8 E+0	Maximum Detected

TABLE 3-3

SUMMARY OF COMPLETE EXPOSURE PATHWAYS FOR POTENTIAL FUTURE LAND USE

	Occupational Population		Residential Population		Recreational Population	
Exposure Route, Medium and Exposure Point	Pathway Selected	Reason for Selection or Exclusion	Pathway Selected	Reason for Selection or Exclusion	Pathway Selected	Reason for Selection or Inclusion
Ingestion of and Dermal Contact with soil at site	Yes	Exposure possible	Yes	Potential residential development on site	Yes	Recreational use of site possible
Ingestion of ground water at the site	Yes	Exposure possible	Yes	Potential residential development on site	Yes	Recreational wells may be installed
Dermal contact with and/or inhalation of ground water through showering	No	No showering by workers	Yes	Potential residential development on site	No	No showering by recreational users
Inhalation of vapor or particulates at site, workplace, or nearby residences	Yes*	Exposure possible	Yes*	Potential residential development on site	Yes*	Recreational use of site possible
Ingestion or or direct contact with surface water or sediments	Yes	Exposure possible	Yes	Surface water and sediments impacted	Yes	Surface water and sediments impacted
Ingestion of food affected by site	Yes*	Ingestion of contaminated wildlife possible	Yes*	Ingestion of contaminated wildlife possible	Yes*	Ingestion of contaminated wildlife possible

* Only qualitative exposures evaluated.

TABLE 3-5
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM WASTE LAGOON SOILS
(mg/kg)

Chemical	Current	Basis	Future	Basis
4-Methylphenol	nd		1.1 E+1	Upper 95% Confidence Limit
Hexachloroethane	nd		6.6 E+0	Upper 95% Confidence Limit
Benzoic Acid	nd		1.8 E+2	Upper 95% Confidence Limit
Naphthalene	nd		9.3 E+1	Upper 95% Confidence Limit
2-Methylnaphthalene	nd		4.3 E+1	Upper 95% Confidence Limit
Dimethyl Phthalate	nd		9.0 E+0	Upper 95% Confidence Limit
Acenaphthylene	nd		8.5 E+0	Upper 95% Confidence Limit
Acenaphthene	nd		7.9 E+0	Maximum Detected
Dibenzofuran	nd		7.0 E+0	Maximum Detected
Fluorene	nd		7.8 E+0	Upper 95% Confidence Limit
Phenanthrene	nd		2.1 E+1	Upper 95% Confidence Limit
Anthracene	nd		9.4 E+0	Upper 95% Confidence Limit
Di-n-Butylphthalate	nd		1.2 E+1	Upper 95% Confidence Limit
Fluoranthene	nd		9.2 E+0	Upper 95% Confidence Limit
Pyrene	nd		8.8 E+0	Upper 95% Confidence Limit
Butylbenzylphthalate	nd		1.6 E+1	Upper 95% Confidence Limit
Benzo(a)Anthracene	nd		6.4 E+0	Upper 95% Confidence Limit
Chrysene	nd		7.3 E+0	Upper 95% Confidence Limit
bis(2-Ethylhexyl)Phthalate	1.6 E-1	Maximum Detected	2.1 E+1	Upper 95% Confidence Limit
Di-n-Octyl Phthalate	nd		1.0 E+1	Maximum Detected
Benzo(b)Fluoranthene	nd		6.8 E+0	Upper 95% Confidence Limit
Benzo(k)Fluoranthene	nd		5.0 E+0	Maximum Detected
Benzo(a)Pyrene	nd		7.0 E+0	Upper 95% Confidence Limit
Indeno(1,2,3-cd)Pyrene	nd		3.4 E+0	Maximum Detected
Benzo(g,h,i)Perylene	nd		4.1 E+0	Maximum Detected
beta-BHC	nd		9.6 E-3	Maximum Detected
Heptachlor	nd		1.4 E+1	Upper 95% Confidence Limit
Aldrin	nd		4.2 E+0	Upper 95% Confidence Limit
Dieldrin	nd		1.9 E+0	Maximum Detected
4,4'-DDD	nd		7.9 E-2	Maximum Detected
4,4'-DDT	nd		5.5 E-2	Maximum Detected

TABLE 3-5
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM WASTE LAGOON SOILS
(mg/kg)

Chemical	Current	Basis	Future	Basis
Endrin ketone	nd		1.1 E+1	Upper 95% Confidence Limit
gamma-Chlordane	nd		1.1 E+1	Upper 95% Confidence Limit
Aroclor-1248	nd		7.8 E-1	Maximum Detected
Aroclor-1260	nd		1.2 E+0	Maximum Detected
Hexachlorobenzene	nd		1.8 E+3	Maximum Detected
Hexachlorocyclopentadiene	nd		4.3 E+3	Maximum Detected
Hexachlorobutadiene	nd		2.6 E+2	Maximum Detected
Octachlorocyclopentene	nd		2.3 E+4	Maximum Detected
Heptachloronorborene	nd		2.5 E+3	Maximum Detected
Chlordene	nd		1.2 E+3	Maximum Detected
2,3,7,8-TCDD	nd		2.0 E-6	Upper 95% Confidence Limit
Total TETRA CDD	nd		2.9 E-6	Upper 95% Confidence Limit
Total PENTA CDD	nd		6.7 E-6	Upper 95% Confidence Limit
Total HEXA CDD	nd		7.4 E-6	Upper 95% Confidence Limit
Total HEPTA CDD	nd		2.3 E-5	Upper 95% Confidence Limit
Total OCTA CDD	nd		1.8 E-4	Upper 95% Confidence Limit
2,3,7,8-TCDF	nd		1.7 E-6	Upper 95% Confidence Limit
Total TETRA CDF	nd		3.8 E-5	Upper 95% Confidence Limit
Total PENTA CDF	nd		5.1 E-5	Upper 95% Confidence Limit
Total HEXA CDF	nd		5.5 E-5	Upper 95% Confidence Limit
Total HEPTA CDF	nd		1.3 E-4	Upper 95% Confidence Limit
Total OCTA CDF	nd		1.5 E-4	Upper 95% Confidence Limit

nd = not detected

TABLE 3-6

CONCENTRATIONS USED TO ESTIMATE INTAKES FROM SITE-WIDE SOILS

(mg/kg)

Chemical	Current Concentration (All Populations)	Basis	Future Concentration (All Populations)	Basis
Antimony	7.2 E+0	Upper 95% Confidence Limit	6.8 E+0	Upper 95% Confidence Limit
Cadmium	2.2 E+0	Upper 95% Confidence Limit	1.3 E+0	Upper 95% Confidence Limit
Chromium	2.5 E+1	Upper 95% Confidence Limit	2.3 E+1	Upper 95% Confidence Limit
Copper	4.3 E+1	Upper 95% Confidence Limit	3.6 E+1	Upper 95% Confidence Limit
Lead	1.5 E+2	Upper 95% Confidence Limit	8.9 E+1	Upper 95% Confidence Limit
Silver	2.9 E+0	Upper 95% Confidence Limit	2.0 E+0	Upper 95% Confidence Limit
Zinc	2.9 E+2	Upper 95% Confidence Limit	1.9 E+2	Upper 95% Confidence Limit
Cyanide	9.6 E-1	Upper 95% Confidence Limit	7.6 E-1	Upper 95% Confidence Limit
Methylene Chloride	3.0 E-2	Upper 95% Confidence Limit	2.5 E-1	Upper 95% Confidence Limit
Acetone	2.3 E-2	Upper 95% Confidence Limit	2.6 E-1	Upper 95% Confidence Limit
2-Butanone	1.4 E-2	Upper 95% Confidence Limit	4.5 E-2	Maximum Detected
Benzene	2.2 E-3	Maximum Detected	2.2 E-3	Maximum Detected
Tetrachloroethene	8.4 E-3	Upper 95% Confidence Limit	3.9 E-1	Upper 95% Confidence Limit
Toluene	4.5 E-3	Upper 95% Confidence Limit	6.6 E-2	Upper 95% Confidence Limit
Chlorobenzene	2.0 E-3	Maximum Detected	2.0 E-3	Maximum Detected
Ethylbenzene	1.0 E-3	Maximum Detected	2.0 E-3	Maximum Detected
Xylene (total)	5.9 E-3	Upper 95% Confidence Limit	1.6 E-2	Maximum Detected
4-Methylphenol	1.4 E-1	Maximum Detected	1.4 E-1	Maximum Detected
Naphthalene	nd		2.2 E-1	Maximum Detected
2-Methylnaphthalene	nd		6.4 E-2	Maximum Detected
Diethylphthalate	nd		7.8 E-2	Maximum Detected
Phenanthrene	1.1 E+0	Upper 95% Confidence Limit	6.9 E-1	Upper 95% Confidence Limit
Anthracene	3.4 E-1	Maximum Detected	3.4 E-1	Maximum Detected
Di-n-Butylphthalate	4.9 E-1	Maximum Detected	4.5 E-1	Upper 95% Confidence Limit
Fluoranthene	1.4 E+0	Upper 95% Confidence Limit	8.6 E-1	Upper 95% Confidence Limit
Pyrene	1.4 E+0	Upper 95% Confidence Limit	8.5 E-1	Upper 95% Confidence Limit
Butylbenzylphthalate	1.0 E+0	Upper 95% Confidence Limit	6.4 E-1	Upper 95% Confidence Limit
Benzo(a)Anthracene	1.2 E+0	Upper 95% Confidence Limit	6.8 E-1	Upper 95% Confidence Limit
Chrysene	1.1 E+0	Upper 95% Confidence Limit	7.0 E-1	Upper 95% Confidence Limit
bis(2-Ethylhexyl)Phthalate	1.5 E+0	Upper 95% Confidence Limit	9.3 E-1	Upper 95% Confidence Limit

TABLE 3-6

CONCENTRATIONS USED TO ESTIMATE INTAKES FROM SITE-WIDE SOILS

(mg/kg)

Chemical	Current Concentration (All Populations)	Basis	Future Concentration (All Populations)	Basis
Di-n-Octyl Phthalate	5.9 E-1	Upper 95% Confidence Limit	4.5 E-1	Upper 95% Confidence Limit
Benzo(b)Fluoranthene	1.7 E+0	Upper 95% Confidence Limit	8.9 E-1	Upper 95% Confidence Limit
Benzo(k)Fluoranthene	5.6 E-1	Upper 95% Confidence Limit	4.5 E-1	Upper 95% Confidence Limit
Benzo(a)Pyrene	9.3 E-1	Upper 95% Confidence Limit	6.4 E-1	Upper 95% Confidence Limit
Indeno(1,2,3-cd)Pyrene	5.1 E-1	Upper 95% Confidence Limit	4.3 E-1	Upper 95% Confidence Limit
Benzo(g,h,i)Perylene	5.5 E-1	Upper 95% Confidence Limit	4.5 E-1	Upper 95% Confidence Limit
4,4'-DDE	nd		2.3 E-2	Upper 95% Confidence Limit
Endrin	1.9 E-1	Upper 95% Confidence Limit	5.8 E-2	Upper 95% Confidence Limit
4,4'-DDD	1.0 E-2	Maximum Detected	2.6 E-2	Upper 95% Confidence Limit
4,4'-DDT	1.3 E-2	Maximum Detected	2.5 E-2	Upper 95% Confidence Limit
Aroclor-1254	9.8 E+2	Maximum Detected	3.0 E+1	Upper 95% Confidence Limit
Hexachlorobenzene	2.3 E+1	Maximum Detected	2.3 E+1	Maximum Detected
Hexachlorobutadiene	4.1 E-3	Maximum Detected	4.1 E-3	Maximum Detected
Heptachloronorborene	2.7 E-3	Maximum Detected	1.7 E-3	Upper 95% Confidence Limit
Total HEPTA CDD	2.1 E-4	Maximum Detected	6.8 E-6	Upper 95% Confidence Limit
Total OCTA CDD	1.9 E-4	Maximum Detected	1.3 E-6	Upper 95% Confidence Limit
2,3,7,8-TCDD	nd		8.0 E-6	Maximum Detected
Total TETRA CDF	nd		8.0 E-6	Maximum Detected

nd = not detected

TABLE 3-7
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM GROUND WATER[1]
(units as shown)

Chemical	Current		Future	
	Ground Water (mg/l)	Shower Air (mg/m³)	Ground Water (mg/l)	Shower Air (mg/m³)
Aluminum	9.3 E-2	nd	5.6 E+1	nd
Arsenic	nd	nd	6.1 E-2	nd
Barium	1.2 E-1	nd	6.0 E+0	nd
Cadmium	2.1 E-3	nd	6.4 E-2	nd
Chromium	nd	nd	1.4 E-1	nd
Cobalt	nd	nd	3.1 E-1	nd
Copper	3.8 E-2	nd	1.6 E-1	nd
Lead	6.9 E-3	nd	5.4 E-1	nd
Manganese	6.7 E-1	nd	1.8 E+1	nd
Nickel	nd	nd	4.1 E-1	nd
Vanadium	nd	nd	1.4 E-1	nd
Zinc	1.3 E+0	nd	1.3 E+0	nd
Cyanide	nd	nd	2.4 E-2	nd
Vinyl Chloride	nd	nd	4.8 E-2	1.5 E-1
Chloroethane	nd	nd	5.2 E-2	8.0 E-2
Methylene Chloride	nd	nd	1.4 E-2	9.1 E-3
Acetone	nd	nd	5.9 E+0	2.2 E+0
1,1-Dichloroethane	nd	nd	8.2 E-2	2.9 E-2
1,2-Dichloroethene	nd	nd	4.5 E+0	6.2 E-1
Chloroform	8.0 E-3	2.4 E-3	8.5 E-2	2.6 E-2
1,2-Dichloroethane	nd	nd	1.8 E-1	2.1 E-2
2-Butanone	nd	nd	3.6 E-2	5.8 E-3
1,1,1-Trichloroethane	nd	nd	1.2 E-2	2.5 E-3
Carbon Tetrachloride	nd	nd	6.7 E-3	1.2 E-3
1,2-Dichloropropane	nd	nd	3.7 E-1	3.3 E-2
Trichloroethene	nd	nd	7.1 E-2	9.1 E-3
1,1,2-Trichloroethane	nd	nd	5.5 E-2	2.6 E-3
Benzene	nd	nd	2.0 E+1	3.2 E+0
Tetrachloroethene	nd	nd	2.0 E-2	7.4 E-4
1,1,2,2-Tetrachloroethane	nd	nd	6.0 E-3	1.2 E-3
Toluene	nd	nd	3.1 E+0	1.7 E-1
Chlorobenzene	nd	nd	2.7 E-2	6.8 E-4

TABLE 3-7
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM GROUND WATER[1]
(units as shown)

Chemical	Current		Future	
	Ground Water (mg/l)	Shower Air (mg/m^3)	Ground Water (mg/l)	Shower Air (mg/m^3)
Ethylbenzene	nd	nd	8.0 E-2	1.7 E-3
Xylene (total)	nd	nd	1.8 E-1	3.5 E-3
Phenol	nd	nd	6.7 E-1	9.3 E-4
bis(2-Chloroethyl)Ether	nd	nd	2.4 E-1	4.5 E-4
1,4-Dichlorobenzene	nd	nd	1.1 E-2	5.2 E-5
Benzyl Alcohol	nd	nd	1.0 E-3	5.3 E-7
1,2-Dichlorobenzene	nd	nd	6.0 E-3	2.2 E-5
2-Methylphenol	nd	nd	4.5 E-1	4.5 E-4
4-Methylphenol	nd	nd	3.5 E-1	1.6 E-4
Naphthalene	7.3 E-4	5.7 E-7	6.4 E-2	5.0 E-5
2-Methylnaphthalene	nd	nd	3.0 E-3	nd
Pentachlorophenol	nd	nd	2.6 E-1	nd
Di-n-Butylphthalate	nd	nd	3.0 E-3	nd
bis(2-Ethylhexyl)Phthalate	nd	nd	1.2 E-2	nd
Aldrin	nd	nd	5.0 E-4	nd
Dieldrin	nd	nd	1.3 E-4	nd
4,4'-DDT	9.0 E-5	nd	9.0 E-5	nd
Aroclor-1254	2.0 E-4	nd	2.0 E-4	nd
Hexachlorobenzene	nd	nd	2.4 E-4	nd
Hexachlorobutadiene	nd	nd	8.7 E-5	nd
Heptachloronorborene	nd	nd	1.1 E-4	nd

nd = not detected

[1] Current residential exposures are based on the maximum concentration of a compound detected in private wells. Future use exposures are based on the maximum concentration of a contaminant found in any well on the site.

TABLE 3-8
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM SURFACE WATER
(mg/l)

Chemical	Mill Creek			Skinner Creek		Diving Pond		Trilobite Pond	
	Current	Basis	Future	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis
Aluminum	nd		5.0 E-4	nd		nd		4.6 E+0	Max
Arsenic	nd		6.4 E-4	nd		nd		nd	
Barium	6.3 E-2	Upper 95%	5.6 E-1	nd		nd		4.0 E-2	Upper 95%
Cadmium	nd		8.4 E-4	nd		5.8 E-3	Max	nd	
Chromium	nd		3.7 E-5	nd		nd		nd	
Cobalt	5.6 E-3	Max	4.7 E-5	nd		nd		nd	
Copper	nd		1.7 E-3	nd		nd		nd	
Lead	nd		7.4 E-3	nd		nd		nd	
Manganese	nd		8.7 E-3	6.9 E-2	Upper 95%	nd		nd	
Nickel	7.8 E-3	Max	1.1 E-2	nd		8.4 E-3	Max	nd	
Vanadium	5.0 E-3	Upper 95%	1.3 E-2	nd		9.9 E-3	Max	1.0 E-2	Max
Zinc	nd		5.3 E-2	nd		nd		nd	
Cyanide	nd		1.2 E-4	nd		nd		nd	
Vinyl Chloride	nd		2.0 E-4	nd		nd		nd	
Chloroethane	nd		5.1 E-4	nd		nd		nd	
Methylene Chloride	nd		5.1 E-5	nd		nd		nd	
Acetone	nd		2.9 E-4	nd		nd		nd	
Carbon Disulfide	3.0 E-4	Max	nd	nd		nd		nd	
1,1-Dichloroethane	nd		8.5 E-4	nd		nd		nd	
1,2-Dichloroethene	nd		3.6 E-4	nd		nd		nd	
Chloroform	nd		2.2 E-1	nd		nd		nd	
1,2-Dichloroethane	nd		1.1 E-3	nd		nd		nd	
2-Butanone	nd		1.5 E-4	nd		nd		nd	
1,1,1-Trichloroethane	nd		1.2 E-1	nd		nd		nd	
Carbon Tetrachloride	nd		1.1 E-1	nd		nd		nd	
1,2-Dichloropropane	nd		1.9 E+0	nd		nd		nd	
Trichloroethene	nd		3.2 E-1	nd		nd		nd	
1,1,2-Trichloroethane	nd		1.9 E+0	nd		nd		nd	
Benzene	nd		2.1 E-1	nd		nd		nd	
Tetrachloroethene	nd		3.5 E-2	nd		nd		nd	
1,1,2,2-Tetrachloroethane	nd		3.2 E-1	nd		nd		nd	
Toluene	nd		3.6 E+1	nd		nd		nd	

TABLE 3-8
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM SURFACE WATER
(mg/l)

Chemical	Mill Creek			Skinner Creek		Diving Pond		Trilobite Pond	
	Current	Basis	Future	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis
Chlorobenzene	nd		1.3 E-2	nd		nd		nd	
Ethylbenzene	nd		2.6 E-2	nd		nd		nd	
Xylene (total)	3.0 E-3	Max	2.2 E-1	nd		nd		nd	
Phenol	7.7 E-3	Upper 95%	5.5 E-1	3.0 E-3	Max	2.2 E-3	Max	1.0 E-3	Max
bis(2-Chloroethyl)Ether	nd		6.2 E-2	nd		nd		nd	
1,4-Dichlorobenzene	nd		3.2 E-3	nd		nd		nd	
Benzyl Alcohol	nd		2.4 E-1	nd		nd		nd	
1,2-Dichlorobenzene	nd		2.1 E-3	nd		nd		nd	
2-Methylphenol	nd		3.4 E-2	nd		nd		nd	
bis(2-Chloroisopropyl)Ether	nd		nd	nd		nd		nd	
4-Methylphenol	nd		5.1 E-2	nd		nd		nd	
Naphthalene	nd		2.9 E-2	nd		nd		nd	
2-Methylnaphthalene	nd		4.6 E-3	nd		nd		nd	
Dimethyl Phthalate	nd		nd	nd		nd		1.0 E-3	Max
Diethylphthalate	4.0 E-3	Max	nd	3.0 E-3	Max	nd		2.0 E-3	Max
Pentachlorophenol	nd		1.9 E-3	nd		nd		nd	
Di-n-Butylphthalate	1.0 E-2	Max	3.7 E-4	nd		nd		nd	
Pyrene	nd		nd	nd		nd		nd	
Butylbenzylphthalate	nd		nd	3.0 E-3	Max	nd		nd	
bis(2-Ethylhexyl)Phthalate	1.1 E-2	Upper 95%	5.7 E-4	4.7 E-2	Upper 95%	4.1 E-2	Max	nd	
Di-n-Octyl Phthalate	4.3 E-3	Max	nd	3.6 E-3	Max	nd		nd	
Aldrin	nd		1.2 E-3	nd		nd		nd	
Dieldrin	nd		5.5 E-4	nd		nd		nd	
4,4'-DDT	nd		1.6 E-5	nd		nd		nd	
Aroclor-1254	nd		1.3 E-5	nd		nd		nd	
Hexachlorobenzene	nd		1.3 E-1	nd		3.3 E-5	Max	nd	
Hexachlorobutadiene	nd		2.6 E-3	nd		8.0 E-6	Max	1.1 E-5	Max
Heptachloronorborene	nd		1.4 E-2	nd		nd		nd	

nd = not detected

TABLE 3-9
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM CREEK AND POND SEDIMENTS
(mg/kg)

Chemical	Mill Creek		Skinner Creek		Duck Pond		Diving Pond		Trilobite Pond	
	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis
Aluminum	nd		1.2 E+4	Upper 95%	2.5 E+4	Max	1.5 E+4	Max	4.3 E+4	Max
Barium	nd		nd		2.1 E+2	Max	nd		nd	
Beryllium	nd		nd		nd		nd		2.3 E+0	Max
Chromium	nd		nd		3.0 E+1	Max	2.7 E+1	Max	4.6 E+1	Max
Cobalt	nd		nd		1.9 E+1	Max	nd		2.2 E+1	Max
Copper	nd		nd		2.9 E+1	Max	nd		2.3 E+1	Max
Lead	2.1 E+1	Upper 95%	7.3 E+1	Upper 95%	nd		5.1 E+2	Max	nd	
Mercury	1.3 E-1	Max	nd		nd		nd		nd	
Nickel	nd		nd		2.4 E+1	Max	nd		3.9 E+1	Max
Thallium	nd		nd		6.1 E-1	Max	nd		nd	
Tin	nd		5.2 E+1	Max	nd		4.7 E+1	Max	nd	
Vanadium	nd		2.7 E+1	Upper 95%	5.5 E+1	Max	nd		7.3 E+1	Max
Zinc	nd		nd		nd		1.3 E+2	Max	nd	
Methylene Chloride	nd		nd		nd		nd		nd	
Acetone	1.2 E-2	Upper 95%	3.2 E-2	Upper 95%	nd		nd		nd	
Carbon Disulfide	1.4 E-3	Max	nd		nd		nd		nd	
1,1-Dichloroethene	nd		nd		nd		3.0 E-2	Max	nd	
1,2-Dichloroethene	nd		8.3 E-2	Max	nd		nd		nd	
2-Butanone	nd		nd		nd		1.1 E-2	Max	nd	
Trichloroethene	nd		1.2 E-2	Upper 95%	nd		1.6 E-3	Max	nd	
Benzene	nd		nd		nd		4.0 E-2	Max	nd	
4-Methyl-2-Pentanone	1.6 E-3	Max	4.9 E-3	Max	nd		nd		nd	
2-Hexanone	nd		5.1 E-3	Max	nd		nd		nd	
1,1,2,2-Tetrachloroethane	nd		2.0 E-3	Max	nd		nd		nd	
Ethylbenzene	nd		nd		nd		7.4 E-2	Max	nd	
Xylene (total)	nd		nd		nd		2.6 E-1	Max	nd	
Phenol	1.4 E-1	Max	nd		nd		nd		nd	
4-Methylphenol	7.0 E-1	Upper 95%	1.9 E-2	Max	nd		nd		nd	
Nitrobenzene	nd		4.2 E-3	Max	nd		nd		nd	
Naphthalene	3.8 E-1	Max	6.5 E-2	Max	nd		1.4 E-1	Max	nd	
2-Methylnaphthalene	4.5 E-2	Max	1.0 E-1	Max	nd		4.9 E-1	Max	nd	
Acenaphthylene	1.2 E-1	Max	nd		nd		nd		nd	
Acenaphthene	3.4 E-1	Upper 95%	1.4 E-1	Max	nd		1.6 E-1	Max	nd	

TABLE 3-9
CONCENTRATIONS USED TO ESTIMATE INTAKES FROM CREEK AND POND SEDIMENTS
(mg/kg)

Chemical	Mill Creek		Skinner Creek		Duck Pond		Diving Pond		Trilobite Pond	
	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis	Current & Future	Basis
Dibenzofuran	2.8 E-1	Max	1.3 E-1	Max	nd		nd		nd	
Diethylphthalate	5.2 E-2	Max	2.8 E-2	Max	nd		nd		nd	
Fluorene	3.9 E-1	Max	2.2 E-1	Max	nd		1.4 E-1	Max	nd	
Phenanthrene	9.5 E-1	Upper 95%	1.8 E+0	Max	nd		5.9 E-1	Max	nd	
Anthracene	4.3 E-1	Upper 95%	3.1 E-1	Max	nd		nd		nd	
Di-n-Butylphthalate	nd		1.6 E-1	Max	nd		nd		nd	
Fluoranthene	1.5 E+0	Upper 95%	2.5 E+0	Max	nd		1.4 E-1	Max	nd	
Pyrene	1.3 E+0	Upper 95%	1.5 E+0	Max	nd		5.1 E-1	Upper 95%	nd	
Benzo(a)Anthracene	7.0 E-1	Upper 95%	6.8 E-1	Max	nd		1.0 E-1	Max	nd	
Chrysene	8.4 E-1	Upper 95%	6.9 E-1	Max	nd		1.4 E-1	Max	nd	
bis(2-Ethylhexyl)Phthalate	1.8 E-1	Max	nd		8.0 E-2	Max	1.3 E-1	Max	2.3 E-1	Upper 95%
Benzo(b)Fluoranthene	9.2 E-1	Upper 95%	5.1 E-1	Max	nd		1.6 E-1	Max	nd	
Benzo(k)Fluoranthene	6.7 E-1	Upper 95%	5.1 E-1	Max	nd		nd		nd	
Benzo(a)Pyrene	6.9 E-1	Upper 95%	3.3 E-1	Max	nd		nd		nd	
Indeno(1,2,3-cd)Pyrene	4.0 E-1	Upper 95%	2.6 E-1	Max	nd		nd		nd	
Dibenzo(a,h)Anthracene	1.3 E-1	Max	nd		nd		nd		nd	
Benzo(g,h,i)Perylene	3.9 E-1	Upper 95%	2.1 E-1	Max	nd		nd		nd	
beta-BHC	2.8 E-2	Max	nd		nd		nd		nd	
4,4'-DDD	3.8 E-3	Max	nd		nd		nd		nd	
alpha-Chlordane	4.2 E-3	Max	nd		nd		nd		nd	
Aroclor-1254	1.6 E-1	Max	nd		nd		2.9 E-1	Max	nd	
Aroclor-1260	nd		3.0 E-2	Max	nd		4.4 E-1	Max	nd	
Hexachlorobenzene	1.6 E-2	Max	3.0 E-3	Max	3.2 E-3	Max	7.2 E-3	Max	nd	
Hexachlorocyclopentadiene	nd		6.7 E-2	Max	nd		nd		nd	
Hexachlorobutadiene	1.9 E-3	Max	2.7 E-2	Max	nd		3.4 E-3	Max	nd	
Octachlorocyclopentene	6.5 E-3	Upper 95%	nd		nd		nd		nd	
Heptachloronorborene	nd		2.9 E-2	Max	2.5 E-3	Max	3.7 E-3	Max	1.7 E-3	Max
Chlordene	2.0 E-3	Upper 95%	4.9 E-3	Max	1.6 E-3	Max	nd		nd	

nd = not detected

BLE 3-10
CONSTANTS AND VARIABLES USED FOR INTAKE EQUATIONS

Equation	Parameter	Occupational Current & Future Adult	Residential Current & Future Child	Residential Current & Future Adult	Recreational Current & Future Child	Recreational Current & Future Adult
Soil Ingestion (Equation 1)	CS = Chemical Concentration in Soil (mg/kg)		See Tables 3-5 and 3-6			
	IR = Ingestion Rate (mg soil/day)	50	200	100	12.5	6.3
	CF = Conversion Factor (10 E-6 kg/mg)	0.000001	0.000001	0.000001	0.000001	0.000001
	FI = Fraction Ingested from contaminated source	100%	100%	100%	100%	100%
	EF = Exposure Frequency (days/year)	250	365	365	365	365
	ED = Exposure Duration (years)	47	6	30	6	30
	BW = Body Weight (kg)	70	15.1	70	15.1	70
	AT = Average Time (days)	17,155*	2,190*	10,950*	2,190*	10,950*
Soil Dermal Contact (Equation 2)	CS = Chemical Concentration in Soil (mg/kg)		See Tables 3-5 and 3-6			
	CF = Conversion Factor (10 E-6 kg/mg)	0.000001	0.000001	0.000001	0.000001	0.000001
	SA = Skin Surface Area (cm^2/event)	3,120	3,535	8,620	3,535	8,620
	AF = Soil to Skin Adherence (mg/cm^2)	2.11	2.11	2.11	2.11	2.11
	ABS = Absorption Factor (unitless)	(A)	(A)	(A)	(A)	(A)
	EF = Exposure Frequency (days/year)	250	365	365	365	365
	ED = Exposure Duration (years)	47	6	30	6	30
	BW = Body Weight (kg)	70	15.1	70	15.1	70
	AT = Average Time (days)	17,155*	2,190*	10,950*	2,190*	10,950*
Ground Water Ingestion (Equation 3)	CW = Chemical Concentration in Water (mg/l)		See Table 3-7			
	IR = Ingestion Rate (liters/day)	1	1	2	na	na
	EF = Exposure Frequency (days/year)	250	365	365	na	na
	ED = Exposure Duration (years)	47	6	30	na	na
	BW = Body Weight (kg)	70	15.1	70	na	na
	AT = Average Time (days)	17,155*	2,190*	10,950*	na	na
Ground Water - Dermal Contact via Showering (Equation 4)	CW = Chemical Concentration in Water (mg/l)		See Table 3-7			
	SA = Skin Surface Area Available for Contact (cm^2)	na	7,280	19,400	na	na
	PC = Chemical-specific Dermal Permeability Constant (cm/hour)	na	(B)	(B)	na	na
	ET = Exposure Time (hours/event)	na	0.2	0.2	na	na
	EF = Exposure Frequency (days/year)	na	365	365	na	na
	ED = Exposure Duration (years)	na	6	30	na	na
	CF = Volumetric Conversion Factor for Water (liter/cm^3)	na	0.001	0.001	na	na
	BW = Body Weight (kg)	na	15.1	70	na	na
	AT = Average Time (days)	na	2,190*	10,950*	na	na
Ground Water - Inhalation via Showering (Equation 5)	CA = Chemical Concentration in Air (mg/m^3)		See Table 3-7			
	FR = Fraction Respirable	na	100%	100%	na	na
	IR = Inhalation Rate (m^3/hour) .83	na	0.6	0.6	na	na
	ET = Exposure Time (hours/day)	na	0.37	0.37	na	na
	EF = Exposure Frequency (days/year)	na	365	365	na	na
	ED = Exposure Duration (years)	na	6	30	na	na
	BW = Body Weight (kg)	na	15.1	70	na	na
	AT = Averaging Time (days)	na	2,190*	10,950*	na	na

.BLE 3-10
CONSTANTS AND VARIABLES USED FOR INTAKE EQUATIONS

Equation	Parameter	Occupational Current & Future Adult	Residential Current & Future Child	Residential Current & Future Adult	Recreational Current & Future Child	Recreational Current & Future Adult
Surface Water Ingestion (Equation 6)	CW = Chemical Concentration in Water (mg/l)		See Table 3-8			
	CR = Contact Rate (liters/hour)	na	0.05	0.05	0.05	0.05
	ET = Exposure Time (hours/event)	na	2.6	2.6	2.6	2.6
	EF = Exposure Frequency (days/year)	na	7	7	7	7
	ED = Exposure Duration (years)	na	6	30	6	30
	BW = Body Weight (kg)	na	15.1	70	15.1	70
	AT = Average Time (days)	na	2,190*	10,950*	2,190*	10,950*
Surface Water Dermal Contact (Equation 4)	CW = Chemical Concentration in Water (mg/l)		See Table 3-8			
	SA = Skin Surface Area Available for Contact (cm^2)	na	7,280	19,400	7,280	19,400
	PC = Chemical-specific Dermal Permeability Constant (cm/hour)	na	(B)	(B)	(B)	(B)
	ET = Exposure Time (hours/event)	na	2.6	2.6	2.6	2.6
	EF = Exposure Frequency (days/year)	na	7	7	7	7
	ED = Exposure Duration (years)	na	6	30	6	30
	CF = Volumetric Conversion Factor for Water (liter/cm^3)	na	0.001	0.001	0.001	0.001
	BW = Body Weight (kg)	na	15.1	70	15.1	70
	AT = Average Time (days)	na	2,190*	10,950*	2,190*	10,950*
Sediment Ingestion (Equation 1)	CS = Chemical Concentration in Sediments (mg/kg)		See Table 3-9			
	IR = Ingestion Rate (mg soil/day)	na	22	11	22	11
	CF = Conversion Factor (10 E-6 kg/mg)	na	0.000001	0.000001	0.000001	0.000001
	FI = Fraction Ingested from contaminated source	na	100%	100%	100%	100%
	EF = Exposure Frequency (days/year)	na	7	7	7	7
	ED = Exposure Duration (years)	na	6	30	6	30
	BW = Body Weight (kg)	na	15.1	70	15.1	70
	AT = Average Time (days)	na	2,190*	10,950*	2,190*	10,950*
Sediment Dermal Contact (Equation 2)	CS = Chemical Concentration in Sediments (mg/kg)		See Table3-9			
	CF = Conversion Factor (10 E-6 kg/mg)	na	0.000001	0.000001	0.000001	0.000001
	SA = Skin Surface Area (cm^2/event)	na	3,535	8,620	3,535	8,620
	AF = Soil to Skin Adherence (mg/cm^2)	na	2.11	2.11	2.11	2.11
	ABS = Absorption Factor (unitless)	na	(A)	(A)	(A)	(A)
	EF = Exposure Frequency (days/year)	na	7	7	7	7
	ED = Exposure Duration (years)	na	6	30	6	30
	BW = Body Weight (kg)	na	15.1	70	15.1	70
	AT = Average Time (days)	na	2,190*	10,950*	2,190*	10,950*

* For carcinogens, an averaging time of 25,550 days (70 years times 365 days/year) was used to allow comparisons to slope factors based on 70 years.

(A) Absorption factors used are: 25% for volatile organics; 10% for semi-volatile organics; and 1% for inorganics (Ryan, et al, 1987).

(B) Dermal permeability constants (cm/hour) are: 0.111, benzene; 0.005, 2-butanone; 0.0021, chromium; 0.1, ethylbenzene and xylene; 0.00016, hexachlorobenzene; 1.01, toluene and other volatile organics; and 0.0015, other inorganics and semi-volatile organics.

TABLE 3-11
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	1.1 E-5	3.0 E-4	3.3 E-5	1.9 E-5	2.1 E-6	3.5 E-6	9.5 E-5	1.0 E-5	5.9 E-6	6.5 E-7
Cadmium	nd	nd	nd	nd	nd	7.1 E-7	1.9 E-5	2.1 E-6	1.2 E-6	1.3 E-7
Lead	6.8 E-5	1.8 E-3	2.0 E-4	1.2 E-4	1.3 E-5	6.2 E-5	1.7 E-3	1.8 E-4	1.1 E-4	1.1 E-5
Silver	nd	nd	nd	nd	nd	4.2 E-7	1.1 E-5	1.2 E-6	7.1 E-7	7.8 E-8
Thallium	nd	nd	nd	nd	nd	4.4 E-7	1.2 E-5	1.3 E-6	7.5 E-7	8.2 E-8
Tin	2.0 E-4	5.4 E-3	5.8 E-4	3.4 E-4	3.7 E-5	2.0 E-4	5.4 E-3	5.8 E-4	3.4 E-4	3.7 E-5
Cyanide	nd	nd	nd	nd	nd	8.0 E-7	2.2 E-5	2.3 E-6	1.4 E-6	1.5 E-7
Methylene Chloride	3.1 E-9	8.5 E-8	9.1 E-9	5.3 E-9	5.8 E-10	2.6 E-6	7.0 E-5	7.6 E-6	4.4 E-6	4.8 E-7
Acetone	6.8 E-9	1.9 E-7	2.0 E-8	1.2 E-8	1.3 E-9	6.8 E-5	1.9 E-3	2.0 E-4	1.2 E-4	1.3 E-5
Chloroform	nd	nd	nd	nd	nd	1.6 E-5	4.4 E-4	4.7 E-5	2.7 E-5	3.0 E-6
1,2-Dichloroethane	nd	nd	nd	nd	nd	1.0 E-4	2.8 E-3	3.0 E-4	1.7 E-4	1.9 E-5
2-Butanone	nd	nd	nd	nd	nd	1.9 E-5	5.2 E-4	5.6 E-5	3.2 E-5	3.5 E-6
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	3.1 E-5	8.3 E-4	9.0 E-5	5.2 E-5	5.7 E-6
Carbon Tetrachloride	nd	nd	nd	nd	nd	7.8 E-5	2.1 E-3	2.3 E-4	1.3 E-4	1.4 E-5
1,2-Dichloropropane	nd	nd	nd	nd	nd	1.7 E-4	4.5 E-3	4.9 E-4	2.8 E-4	3.1 E-5
Trichloroethene	nd	nd	nd	nd	nd	6.8 E-5	1.9 E-3	2.0 E-4	1.2 E-4	1.3 E-5
1,1,2-Trichloroethane	nd	nd	nd	nd	nd	1.8 E-4	4.9 E-3	5.3 E-4	3.1 E-4	3.3 E-5
Benzene	nd	nd	nd	nd	nd	2.9 E-5	7.9 E-4	8.6 E-5	5.0 E-5	5.4 E-6
Tetrachloroethene	nd	nd	nd	nd	nd	2.2 E-5	5.8 E-4	6.3 E-5	3.6 E-5	4.0 E-6
1,1,2,2-Tetrachloroethane	nd	nd	nd	nd	nd	6.4 E-5	1.7 E-3	1.9 E-4	1.1 E-4	1.2 E-5
Toluene	1.9 E-9	5.0 E-8	5.4 E-9	3.1 E-9	3.4 E-10	1.5 E-2	4.1 E-1	4.4 E-2	2.6 E-2	2.8 E-3
Chlorobenzene	nd	nd	nd	nd	nd	7.3 E-6	2.0 E-4	2.1 E-5	1.2 E-5	1.4 E-6
Ethylbenzene	nd	nd	nd	nd	nd	4.8 E-5	1.3 E-3	1.4 E-4	8.1 E-5	8.8 E-6
Xylene (total)	nd	nd	nd	nd	nd	9.8 E-5	2.6 E-3	2.9 E-4	1.7 E-4	1.8 E-5
Phenol	nd	nd	nd	nd	nd	5.6 E-6	1.5 E-4	1.6 E-5	9.5 E-6	1.0 E-6
bis(2-Chloroethyl)Ether	nd	nd	nd	nd	nd	3.1 E-6	8.4 E-5	9.0 E-6	5.2 E-6	5.7 E-7
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	1.1 E-5	2.9 E-4	3.1 E-5	1.8 E-5	1.9 E-6
1,4-Dichlorobenzene	nd	nd	nd	nd	nd	9.3 E-6	2.5 E-4	2.7 E-5	1.6 E-5	1.7 E-6
Benzyl Alcohol	nd	nd	nd	nd	nd	4.2 E-6	1.1 E-4	1.2 E-5	7.1 E-6	7.7 E-7
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	6.0 E-6	1.6 E-4	1.8 E-5	1.0 E-5	1.1 E-6
2-Methylphenol	nd	nd	nd	nd	nd	3.8 E-6	1.0 E-4	1.1 E-5	6.5 E-6	7.0 E-7

TABLE 3-11
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
4-Methylphenol	nd	nd	nd	nd	nd	5.3 E-6	1.4 E-4	1.6 E-5	9.0 E-6	9.8 E-7
Hexachloroethane	nd	nd	nd	nd	nd	3.2 E-6	8.7 E-5	9.4 E-6	5.4 E-6	5.9 E-7
Benzoic Acid	nd	nd	nd	nd	nd	8.7 E-5	2.4 E-3	2.5 E-4	1.5 E-4	1.6 E-5
Naphthalene	nd	nd	nd	nd	nd	4.6 E-5	1.2 E-3	1.3 E-4	7.7 E-5	8.4 E-6
2-Methylnaphthalene	nd	nd	nd	nd	nd	2.1 E-5	5.7 E-4	6.2 E-5	3.6 E-5	3.9 E-6
Dimethyl Phthalate	nd	nd	nd	nd	nd	4.4 E-6	1.2 E-4	1.3 E-5	7.4 E-6	8.1 E-7
Acenaphthylene	nd	nd	nd	nd	nd	4.2 E-6	1.1 E-4	1.2 E-5	7.1 E-6	7.7 E-7
Acenaphthene	nd	nd	nd	nd	nd	3.9 E-6	1.0 E-4	1.1 E-5	6.5 E-6	7.1 E-7
Dibenzofuran	nd	nd	nd	nd	nd	3.4 E-6	9.3 E-5	1.0 E-5	5.8 E-6	6.3 E-7
Fluorene	nd	nd	nd	nd	nd	3.8 E-6	1.0 E-4	1.1 E-5	6.5 E-6	7.1 E-7
Phenanthrene	nd	nd	nd	nd	nd	1.0 E-5	2.7 E-4	2.9 E-5	1.7 E-5	1.9 E-6
Anthracene	nd	nd	nd	nd	nd	4.6 E-6	1.2 E-4	1.3 E-5	7.8 E-6	8.4 E-7
Di-n-Butylphthalate	nd	nd	nd	nd	nd	5.8 E-6	1.6 E-4	1.7 E-5	9.7 E-6	1.1 E-6
Fluoranthene	nd	nd	nd	nd	nd	4.5 E-6	1.2 E-4	1.3 E-5	7.6 E-6	8.2 E-7
Pyrene	nd	nd	nd	nd	nd	4.3 E-6	1.2 E-4	1.3 E-5	7.3 E-6	7.9 E-7
Butylbenzylphthalate	nd	nd	nd	nd	nd	7.9 E-6	2.1 E-4	2.3 E-5	1.3 E-5	1.4 E-6
Benzo(a)Anthracene	nd	nd	nd	nd	nd	3.1 E-6	8.5 E-5	9.2 E-6	5.3 E-6	5.8 E-7
Chrysene	nd	nd	nd	nd	nd	3.6 E-6	9.7 E-5	1.0 E-5	6.1 E-6	6.6 E-7
bis(2-Ethylhexyl)Phthalate	7.8 E-8	2.1 E-6	2.3 E-7	1.3 E-7	1.4 E-8	1.0 E-5	2.8 E-4	3.0 E-5	1.7 E-5	1.9 E-6
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	4.9 E-6	1.3 E-4	1.4 E-5	8.3 E-6	9.0 E-7
Benzo(b)Fluoranthene	nd	nd	nd	nd	nd	3.3 E-6	9.0 E-5	9.8 E-6	5.7 E-6	6.1 E-7
Benzo(k)Fluoranthene	nd	nd	nd	nd	nd	2.4 E-6	6.6 E-5	7.1 E-6	4.1 E-6	4.5 E-7
Benzo(a)Pyrene	nd	nd	nd	nd	nd	3.4 E-6	9.3 E-5	1.0 E-5	5.8 E-6	6.3 E-7
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	nd	nd	1.7 E-6	4.5 E-5	4.9 E-6	2.8 E-6	3.1 E-7
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	2.0 E-6	5.4 E-5	5.9 E-6	3.4 E-6	3.7 E-7
beta-BHC	nd	nd	nd	nd	nd	4.7 E-9	1.3 E-7	1.4 E-8	7.9 E-9	8.6 E-10
Heptachlor	nd	nd	nd	nd	nd	6.7 E-6	1.8 E-4	2.0 E-5	1.1 E-5	1.2 E-6
Aldrin	nd	nd	nd	nd	nd	2.0 E-6	5.5 E-5	5.9 E-6	3.4 E-6	3.7 E-7
Dieldrin	nd	nd	nd	nd	nd	9.3 E-7	2.5 E-5	2.7 E-6	1.6 E-6	1.7 E-7
4,4'-DDD	nd	nd	nd	nd	nd	3.9 E-8	1.0 E-6	1.1 E-7	6.5 E-8	7.1 E-9
4,4'-DDT	nd	nd	nd	nd	nd	2.7 E-8	7.3 E-7	7.9 E-8	4.6 E-8	5.0 E-9

TABLE 3-11
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	5.2 E-6	1.4 E-4	1.5 E-5	8.9 E-6	9.6 E-7
gamma-Chlordane	nd	nd	nd	nd	nd	5.5 E-6	1.5 E-4	1.6 E-5	9.2 E-6	1.0 E-6
Aroclor-1248	nd	nd	nd	nd	nd	3.8 E-7	1.0 E-5	1.1 E-6	6.5 E-7	7.0 E-8
Aroclor-1260	nd	nd	nd	nd	nd	5.9 E-7	1.6 E-5	1.7 E-6	9.9 E-7	1.1 E-7
Hexachlorobenzene	nd	nd	nd	nd	nd	8.8 E-4	2.4 E-2	2.6 E-3	1.5 E-3	1.6 E-4
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	2.1 E-3	5.7 E-2	6.1 E-3	3.6 E-3	3.9 E-4
Hexachlorobutadiene	nd	nd	nd	nd	nd	1.3 E-4	3.4 E-3	3.7 E-4	2.2 E-4	2.3 E-5
Octachlorocyclopentene	nd	nd	nd	nd	nd	1.1 E-2	3.0 E-1	3.3 E-2	1.9 E-2	2.1 E-3
Heptachloronorborene	nd	nd	nd	nd	nd	1.2 E-3	3.3 E-2	3.6 E-3	2.1 E-3	2.3 E-4
Chlordene	nd	nd	nd	nd	nd	5.9 E-4	1.6 E-2	1.7 E-3	9.9 E-4	1.1 E-4
2,3,7,8-TCDD	nd	nd	nd	nd	nd	9.8 E-13	2.7 E-11	2.9 E-12	1.7 E-12	1.8 E-13
Total TETRA CDD	nd	nd	nd	nd	nd	1.4 E-12	3.8 E-11	4.1 E-12	2.4 E-12	2.6 E-13
Total PENTA CDD	nd	nd	nd	nd	nd	3.3 E-12	8.9 E-11	9.6 E-12	5.6 E-12	6.1 E-13
Total HEXA CDD	nd	nd	nd	nd	nd	3.6 E-12	9.8 E-11	1.1 E-11	6.1 E-12	6.7 E-13
Total HEPTA CDD	nd	nd	nd	nd	nd	1.1 E-11	3.0 E-10	3.3 E-11	1.9 E-11	2.0 E-12
Total OCTA CDD	nd	nd	nd	nd	nd	8.6 E-11	2.3 E-9	2.5 E-10	1.5 E-10	1.6 E-11
2,3,7,8-TCDF	nd	nd	nd	nd	nd	8.3 E-13	2.2 E-11	2.4 E-12	1.4 E-12	1.5 E-13
Total TETRA CDF	nd	nd	nd	nd	nd	1.8 E-11	5.0 E-10	5.4 E-11	3.1 E-11	3.4 E-12
Total PENTA CDF	nd	nd	nd	nd	nd	2.5 E-11	6.8 E-10	7.3 E-11	4.2 E-11	4.6 E-12
Total HEXA CDF	nd	nd	nd	nd	nd	2.7 E-11	7.3 E-10	7.9 E-11	4.6 E-11	5.0 E-12
Total HEPTA CDF	nd	nd	nd	nd	nd	6.3 E-11	1.7 E-9	1.8 E-10	1.1 E-10	1.2 E-11
Total OCTA CDF	nd	nd	nd	nd	nd	7.2 E-11	2.0 E-9	2.1 E-10	1.2 E-10	1.3 E-11

nd = not detected or not calculated

TABLE 3-12
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	1.5 E-5	1.1 E-4	6.0 E-5	1.1 E-4	6.0 E-5	4.6 E-6	3.5 E-5	1.9 E-5	3.5 E-5	1.9 E-5
Cadmium	nd	nd	nd	nd	nd	9.4 E-7	7.2 E-6	3.8 E-6	7.2 E-6	3.8 E-6
Lead	9.0 E-5	6.9 E-4	3.6 E-4	6.9 E-4	3.6 E-4	8.2 E-5	6.3 E-4	3.3 E-4	6.3 E-4	3.3 E-4
Silver	nd	nd	nd	nd	nd	5.6 E-7	4.3 E-6	2.2 E-6	4.3 E-6	2.2 E-6
Thallium	nd	nd	nd	nd	nd	5.8 E-7	4.5 E-6	2.4 E-6	4.5 E-6	2.4 E-6
Tin	2.6 E-4	2.0 E-3	1.1 E-3	2.0 E-3	1.1 E-3	2.6 E-4	2.0 E-3	1.1 E-3	2.0 E-3	1.1 E-3
Cyanide	nd	nd	nd	nd	nd	1.1 E-6	8.1 E-6	4.2 E-6	8.1 E-6	4.2 E-6
Methylene Chloride	1.0 E-7	7.9 E-7	4.2 E-7	7.9 E-7	4.2 E-7	8.5 E-5	6.5 E-4	3.4 E-4	6.5 E-4	3.4 E-4
Acetone	2.3 E-7	1.7 E-6	9.1 E-7	1.7 E-6	9.1 E-7	2.3 E-3	1.7 E-2	9.1 E-3	1.7 E-2	9.1 E-3
Chloroform	nd	nd	nd	nd	nd	5.3 E-4	4.1 E-3	2.1 E-3	4.1 E-3	2.1 E-3
1,2-Dichloroethane	nd	nd	nd	nd	nd	3.4 E-3	2.6 E-2	1.4 E-2	2.6 E-2	1.4 E-2
2-Butanone	nd	nd	nd	nd	nd	6.3 E-4	4.8 E-3	2.5 E-3	4.8 E-3	2.5 E-3
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	1.0 E-3	7.8 E-3	4.1 E-3	7.8 E-3	4.1 E-3
Carbon Tetrachloride	nd	nd	nd	nd	nd	2.6 E-3	2.0 E-2	1.0 E-2	2.0 E-2	1.0 E-2
1,2-Dichloropropane	nd	nd	nd	nd	nd	5.5 E-3	4.2 E-2	2.2 E-2	4.2 E-2	2.2 E-2
Trichloroethene	nd	nd	nd	nd	nd	2.3 E-3	1.7 E-2	9.1 E-3	1.7 E-2	9.1 E-3
1,1,2-Trichloroethane	nd	nd	nd	nd	nd	6.0 E-3	4.6 E-2	2.4 E-2	4.6 E-2	2.4 E-2
Benzene	nd	nd	nd	nd	nd	9.7 E-4	7.4 E-3	3.9 E-3	7.4 E-3	3.9 E-3
Tetrachloroethene	nd	nd	nd	nd	nd	7.1 E-4	5.4 E-3	2.9 E-3	5.4 E-3	2.9 E-3
1,1,2,2-Tetrachloroethane	nd	nd	nd	nd	nd	2.1 E-3	1.6 E-2	8.4 E-3	1.6 E-2	8.4 E-3
Toluene	6.1 E-8	4.7 E-7	2.5 E-7	4.7 E-7	2.5 E-7	5.0 E-1	3.8 E+0	2.0 E+0	3.8 E+0	2.0 E+0
Chlorobenzene	nd	nd	nd	nd	nd	2.4 E-4	1.9 E-3	9.7 E-4	1.9 E-3	9.7 E-4
Ethylbenzene	nd	nd	nd	nd	nd	1.6 E-3	1.2 E-2	6.4 E-3	1.2 E-2	6.4 E-3
Xylene (total)	nd	nd	nd	nd	nd	3.2 E-3	2.5 E-2	1.3 E-2	2.5 E-2	1.3 E-2
Phenol	nd	nd	nd	nd	nd	7.4 E-5	5.6 E-4	3.0 E-4	5.6 E-4	3.0 E-4
bis(2-Chloroethyl)Ether	nd	nd	nd	nd	nd	4.1 E-5	3.1 E-4	1.6 E-4	3.1 E-4	1.6 E-4
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	1.4 E-4	1.1 E-3	5.6 E-4	1.1 E-3	5.6 E-4
1,4-Dichlorobenzene	nd	nd	nd	nd	nd	1.2 E-4	9.4 E-4	4.9 E-4	9.4 E-4	4.9 E-4
Benzyl Alcohol	nd	nd	nd	nd	nd	5.5 E-5	4.3 E-4	2.2 E-4	4.3 E-4	2.2 E-4
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	8.0 E-5	6.1 E-4	3.2 E-4	6.1 E-4	3.2 E-4
2-Methylphenol	nd	nd	nd	nd	nd	5.0 E-5	3.9 E-4	2.0 E-4	3.9 E-4	2.0 E-4

TABLE 3-12
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
4-Methylphenol	nd	nd	nd	nd	nd	7.0 E-5	5.4 E-4	2.8 E-4	5.4 E-4	2.8 E-4
Hexachloroethane	nd	nd	nd	nd	nd	4.2 E-5	3.2 E-4	1.7 E-4	3.2 E-4	1.7 E-4
Benzoic Acid	nd	nd	nd	nd	nd	1.1 E-3	8.8 E-3	4.6 E-3	8.8 E-3	4.6 E-3
Naphthalene	nd	nd	nd	nd	nd	6.0 E-4	4.6 E-3	2.4 E-3	4.6 E-3	2.4 E-3
2-Methylnaphthalene	nd	nd	nd	nd	nd	2.8 E-4	2.1 E-3	1.1 E-3	2.1 E-3	1.1 E-3
Dimethyl Phthalate	nd	nd	nd	nd	nd	5.8 E-5	4.4 E-4	2.3 E-4	4.4 E-4	2.3 E-4
Acenaphthylene	nd	nd	nd	nd	nd	5.5 E-5	4.2 E-4	2.2 E-4	4.2 E-4	2.2 E-4
Acenaphthene	nd	nd	nd	nd	nd	5.1 E-5	3.9 E-4	2.1 E-4	3.9 E-4	2.1 E-4
Dibenzofuran	nd	nd	nd	nd	nd	4.5 E-5	3.5 E-4	1.8 E-4	3.5 E-4	1.8 E-4
Fluorene	nd	nd	nd	nd	nd	5.0 E-5	3.9 E-4	2.0 E-4	3.9 E-4	2.0 E-4
Phenanthrene	nd	nd	nd	nd	nd	1.3 E-4	1.0 E-3	5.3 E-4	1.0 E-3	5.3 E-4
Anthracene	nd	nd	nd	nd	nd	6.0 E-5	4.6 E-4	2.4 E-4	4.6 E-4	2.4 E-4
Di-n-Butylphthalate	nd	nd	nd	nd	nd	7.6 E-5	5.8 E-4	3.1 E-4	5.8 E-4	3.1 E-4
Fluoranthene	nd	nd	nd	nd	nd	5.9 E-5	4.5 E-4	2.4 E-4	4.5 E-4	2.4 E-4
Pyrene	nd	nd	nd	nd	nd	5.7 E-5	4.3 E-4	2.3 E-4	4.3 E-4	2.3 E-4
Butylbenzylphthalate	nd	nd	nd	nd	nd	1.0 E-4	7.9 E-4	4.2 E-4	7.9 E-4	4.2 E-4
Benzo(a)Anthracene	nd	nd	nd	nd	nd	4.1 E-5	3.2 E-4	1.7 E-4	3.2 E-4	1.7 E-4
Chrysene	nd	nd	nd	nd	nd	4.7 E-5	3.6 E-4	1.9 E-4	3.6 E-4	1.9 E-4
bis(2-Ethylhexyl)Phthalate	1.0 E-6	7.9 E-6	4.2 E-6	7.9 E-6	4.2 E-6	1.3 E-4	1.0 E-3	5.4 E-4	1.0 E-3	5.4 E-4
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	6.4 E-5	4.9 E-4	2.6 E-4	4.9 E-4	2.6 E-4
Benzo(b)Fluoranthene	nd	nd	nd	nd	nd	4.4 E-5	3.4 E-4	1.8 E-4	3.4 E-4	1.8 E-4
Benzo(k)Fluoranthene	nd	nd	nd	nd	nd	3.2 E-5	2.5 E-4	1.3 E-4	2.5 E-4	1.3 E-4
Benzo(a)Pyrene	nd	nd	nd	nd	nd	4.5 E-5	3.5 E-4	1.8 E-4	3.5 E-4	1.8 E-4
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	nd	nd	2.2 E-5	1.7 E-4	8.8 E-5	1.7 E-4	8.8 E-5
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	2.6 E-5	2.0 E-4	1.1 E-4	2.0 E-4	1.1 E-4
beta-BHC	nd	nd	nd	nd	nd	6.2 E-8	4.7 E-7	2.5 E-7	4.7 E-7	2.5 E-7
Heptachlor	nd	nd	nd	nd	nd	8.8 E-5	6.8 E-4	3.6 E-4	6.8 E-4	3.6 E-4
Aldrin	nd	nd	nd	nd	nd	2.7 E-5	2.1 E-4	1.1 E-4	2.1 E-4	1.1 E-4
Dieldrin	nd	nd	nd	nd	nd	1.2 E-5	9.4 E-5	4.9 E-5	9.4 E-5	4.9 E-5
4,4'-DDD	nd	nd	nd	nd	nd	5.1 E-7	3.9 E-6	2.1 E-6	3.9 E-6	2.1 E-6
4,4'-DDT	nd	nd	nd	nd	nd	3.5 E-7	2.7 E-6	1.4 E-6	2.7 E-6	1.4 E-6

TABLE 3-12
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	6.9 E-5	5.3 E-4	2.8 E-4	5.3 E-4	2.8 E-4
gamma-Chlordane	nd	nd	nd	nd	nd	7.2 E-5	5.5 E-4	2.9 E-4	5.5 E-4	2.9 E-4
Aroclor-1248	nd	nd	nd	nd	nd	5.0 E-6	3.9 E-5	2.0 E-5	3.9 E-5	2.0 E-5
Aroclor-1260	nd	nd	nd	nd	nd	7.7 E-6	5.9 E-5	3.1 E-5	5.9 E-5	3.1 E-5
Hexachlorobenzene	nd	nd	nd	nd	nd	1.2 E-2	8.9 E-2	4.7 E-2	8.9 E-2	4.7 E-2
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	2.8 E-2	2.1 E-1	1.1 E-1	2.1 E-1	1.1 E-1
Hexachlorobutadiene	nd	nd	nd	nd	nd	1.7 E-3	1.3 E-2	6.8 E-3	1.3 E-2	6.8 E-3
Octachlorocyclopentene	nd	nd	nd	nd	nd	1.5 E-1	1.1 E+0	6.0 E-1	1.1 E+0	6.0 E-1
Heptachloronorborene	nd	nd	nd	nd	nd	1.6 E-2	1.2 E-1	6.5 E-2	1.2 E-1	6.5 E-2
Chlordene	nd	nd	nd	nd	nd	7.7 E-3	5.9 E-2	3.1 E-2	5.9 E-2	3.1 E-2
2,3,7,8-TCDD	nd	nd	nd	nd	nd	1.3 E-11	9.9 E-11	5.2 E-11	9.9 E-11	5.2 E-11
Total TETRA CDD	nd	nd	nd	nd	nd	1.9 E-11	1.4 E-10	7.5 E-11	1.4 E-10	7.5 E-11
Total PENTA CDD	nd	nd	nd	nd	nd	4.3 E-11	3.3 E-10	1.7 E-10	3.3 E-10	1.7 E-10
Total HEXA CDD	nd	nd	nd	nd	nd	4.8 E-11	3.7 E-10	1.9 E-10	3.7 E-10	1.9 E-10
Total HEPTA CDD	nd	nd	nd	nd	nd	1.5 E-10	1.1 E-9	5.9 E-10	1.1 E-9	5.9 E-10
Total OCTA CDD	nd	nd	nd	nd	nd	1.1 E-9	8.7 E-9	4.6 E-9	8.7 E-9	4.6 E-9
2,3,7,8-TCDF	nd	nd	nd	nd	nd	1.1 E-11	8.4 E-11	4.4 E-11	8.4 E-11	4.4 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	2.4 E-10	1.9 E-9	9.8 E-10	1.9 E-9	9.8 E-10
Total PENTA CDF	nd	nd	nd	nd	nd	3.3 E-10	2.5 E-9	1.3 E-9	2.5 E-9	1.3 E-9
Total HEXA CDF	nd	nd	nd	nd	nd	3.6 E-10	2.7 E-9	1.4 E-9	2.7 E-9	1.4 E-9
Total HEPTA CDF	nd	nd	nd	nd	nd	8.3 E-10	6.3 E-9	3.3 E-9	6.3 E-9	3.3 E-9
Total OCTA CDF	nd	nd	nd	nd	nd	9.5 E-10	7.3 E-9	3.8 E-9	7.3 E-9	3.8 E-9

nd = not detected or not calculated

TABLE 3-13
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	2.6 E-5	4.2 E-4	9.3 E-5	1.3 E-4	6.2 E-5	8.1 E-6	1.3 E-4	2.9 E-5	4.1 E-5	1.9 E-5
Cadmium	nd	nd	nd	nd	nd	1.6 E-6	2.6 E-5	5.9 E-6	8.4 E-6	3.9 E-6
Lead	1.6 E-4	2.5 E-3	5.6 E-4	8.0 E-4	3.7 E-4	1.4 E-4	2.3 E-3	5.1 E-4	7.3 E-4	3.4 E-4
Silver	nd	nd	nd	nd	nd	9.8 E-7	1.6 E-5	3.5 E-6	5.0 E-6	2.3 E-6
Thallium	nd	nd	nd	nd	nd	1.0 E-6	1.6 E-5	3.7 E-6	5.2 E-6	2.4 E-6
Tin	4.6 E-4	7.4 E-3	1.6 E-3	2.4 E-3	1.1 E-3	4.6 E-4	7.4 E-3	1.6 E-3	2.4 E-3	1.1 E-3
Cyanide	nd	nd	nd	nd	nd	1.8 E-6	3.0 E-5	6.6 E-6	9.4 E-6	4.4 E-6
Methylene Chloride	1.1 E-7	8.8 E-7	4.2 E-7	8.0 E-7	4.2 E-7	8.8 E-5	7.2 E-4	3.5 E-4	6.6 E-4	3.4 E-4
Acetone	2.3 E-7	1.9 E-6	9.3 E-7	1.7 E-6	9.1 E-7	2.3 E-3	1.9 E-2	9.3 E-3	1.7 E-2	9.1 E-3
Chloroform	nd	nd	nd	nd	nd	5.5 E-4	4.5 E-3	2.2 E-3	4.1 E-3	2.1 E-3
1,2-Dichloroethane	nd	nd	nd	nd	nd	3.5 E-3	2.9 E-2	1.4 E-2	2.6 E-2	1.4 E-2
2-Butanone	nd	nd	nd	nd	nd	6.5 E-4	5.3 E-3	2.6 E-3	4.8 E-3	2.5 E-3
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	1.0 E-3	8.6 E-3	4.2 E-3	7.8 E-3	4.1 E-3
Carbon Tetrachloride	nd	nd	nd	nd	nd	2.7 E-3	2.2 E-2	1.1 E-2	2.0 E-2	1.0 E-2
1,2-Dichloropropane	nd	nd	nd	nd	nd	5.6 E-3	4.6 E-2	2.3 E-2	4.2 E-2	2.2 E-2
Trichloroethene	nd	nd	nd	nd	nd	2.3 E-3	1.9 E-2	9.3 E-3	1.7 E-2	9.1 E-3
1,1,2-Trichloroethane	nd	nd	nd	nd	nd	6.1 E-3	5.1 E-2	2.5 E-2	4.6 E-2	2.4 E-2
Benzene	nd	nd	nd	nd	nd	1.0 E-3	8.2 E-3	4.0 E-3	7.5 E-3	3.9 E-3
Tetrachloroethene	nd	nd	nd	nd	nd	7.3 E-4	6.0 E-3	2.9 E-3	5.5 E-3	2.9 E-3
1,1,2,2-Tetrachloroethane	nd	nd	nd	nd	nd	2.2 E-3	1.8 E-2	8.6 E-3	1.6 E-2	8.5 E-3
Toluene	6.3 E-8	5.2 E-7	2.5 E-7	4.7 E-7	2.5 E-7	5.1 E-1	4.2 E+0	2.1 E+0	3.9 E+0	2.0 E+0
Chlorobenzene	nd	nd	nd	nd	nd	2.5 E-4	2.1 E-3	1.0 E-3	1.9 E-3	9.8 E-4
Ethylbenzene	nd	nd	nd	nd	nd	1.6 E-3	1.3 E-2	6.5 E-3	1.2 E-2	6.4 E-3
Xylene (total)	nd	nd	nd	nd	nd	3.3 E-3	2.7 E-2	1.3 E-2	2.5 E-2	1.3 E-2
Phenol	nd	nd	nd	nd	nd	7.9 E-5	7.2 E-4	3.1 E-4	5.7 E-4	3.0 E-4
bis(2-Chloroethyl)Ether	nd	nd	nd	nd	nd	4.4 E-5	4.0 E-4	1.7 E-4	3.2 E-4	1.6 E-4
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	1.5 E-4	1.4 E-3	5.9 E-4	1.1 E-3	5.6 E-4
1,4-Dichlorobenzene	nd	nd	nd	nd	nd	1.3 E-4	1.2 E-3	5.2 E-4	9.5 E-4	5.0 E-4
Benzyl Alcohol	nd	nd	nd	nd	nd	6.0 E-5	5.4 E-4	2.4 E-4	4.3 E-4	2.2 E-4
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	8.6 E-5	7.7 E-4	3.4 E-4	6.2 E-4	3.2 E-4
2-Methylphenol	nd	nd	nd	nd	nd	5.4 E-5	4.9 E-4	2.1 E-4	3.9 E-4	2.0 E-4

TABLE 3-13
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
4-Methylphenol	nd	nd	nd	nd	nd	7.5 E-5	6.8 E-4	3.0 E-4	5.5 E-4	2.8 E-4
Hexachloroethane	nd	nd	nd	nd	nd	4.6 E-5	4.1 E-4	1.8 E-4	3.3 E-4	1.7 E-4
Benzoic Acid	nd	nd	nd	nd	nd	1.2 E-3	1.1 E-2	4.9 E-3	8.9 E-3	4.6 E-3
Naphthalene	nd	nd	nd	nd	nd	6.5 E-4	5.8 E-3	2.6 E-3	4.7 E-3	2.4 E-3
2-Methylnaphthalene	nd	nd	nd	nd	nd	3.0 E-4	2.7 E-3	1.2 E-3	2.2 E-3	1.1 E-3
Dimethyl Phthalate	nd	nd	nd	nd	nd	6.2 E-5	5.6 E-4	2.5 E-4	4.5 E-4	2.3 E-4
Acenaphthylene	nd	nd	nd	nd	nd	5.9 E-5	5.3 E-4	2.3 E-4	4.3 E-4	2.2 E-4
Acenaphthene	nd	nd	nd	nd	nd	5.5 E-5	4.9 E-4	2.2 E-4	4.0 E-4	2.1 E-4
Dibenzofuran	nd	nd	nd	nd	nd	4.9 E-5	4.4 E-4	1.9 E-4	3.5 E-4	1.8 E-4
Fluorene	nd	nd	nd	nd	nd	5.4 E-5	4.9 E-4	2.1 E-4	3.9 E-4	2.0 E-4
Phenanthrene	nd	nd	nd	nd	nd	1.4 E-4	1.3 E-3	5.6 E-4	1.0 E-3	5.4 E-4
Anthracene	nd	nd	nd	nd	nd	6.5 E-5	5.9 E-4	2.6 E-4	4.7 E-4	2.4 E-4
Di-n-Butylphthalate	nd	nd	nd	nd	nd	8.2 E-5	7.4 E-4	3.2 E-4	5.9 E-4	3.1 E-4
Fluoranthene	nd	nd	nd	nd	nd	6.3 E-5	5.7 E-4	2.5 E-4	4.6 E-4	2.4 E-4
Pyrene	nd	nd	nd	nd	nd	6.1 E-5	5.5 E-4	2.4 E-4	4.4 E-4	2.3 E-4
Butylbenzylphthalate	nd	nd	nd	nd	nd	1.1 E-4	1.0 E-3	4.4 E-4	8.1 E-4	4.2 E-4
Benzo(a)Anthracene	nd	nd	nd	nd	nd	4.5 E-5	4.0 E-4	1.8 E-4	3.2 E-4	1.7 E-4
Chrysene	nd	nd	nd	nd	nd	5.1 E-5	4.6 E-4	2.0 E-4	3.7 E-4	1.9 E-4
bis(2-Ethylhexyl)Phthalate	1.1 E-6	1.0 E-5	4.4 E-6	8.0 E-6	4.2 E-6	1.5 E-4	1.3 E-3	5.7 E-4	1.1 E-3	5.5 E-4
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	6.9 E-5	6.3 E-4	2.7 E-4	5.0 E-4	2.6 E-4
Benzo(b)Fluoranthene	nd	nd	nd	nd	nd	4.7 E-5	4.3 E-4	1.9 E-4	3.4 E-4	1.8 E-4
Benzo(k)Fluoranthene	nd	nd	nd	nd	nd	3.5 E-5	3.1 E-4	1.4 E-4	2.5 E-4	1.3 E-4
Benzo(a)Pyrene	nd	nd	nd	nd	nd	4.9 E-5	4.4 E-4	1.9 E-4	3.5 E-4	1.8 E-4
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	nd	nd	2.4 E-5	2.1 E-4	9.3 E-5	1.7 E-4	8.9 E-5
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	2.8 E-5	2.6 E-4	1.1 E-4	2.1 E-4	1.1 E-4
beta-BHC	nd	nd	nd	nd	nd	6.7 E-8	6.0 E-7	2.6 E-7	4.8 E-7	2.5 E-7
Heptachlor	nd	nd	nd	nd	nd	9.5 E-5	8.6 E-4	3.8 E-4	6.9 E-4	3.6 E-4
Aldrin	nd	nd	nd	nd	nd	2.9 E-5	2.6 E-4	1.1 E-4	2.1 E-4	1.1 E-4
Dieldrin	nd	nd	nd	nd	nd	1.3 E-5	1.2 E-4	5.2 E-5	9.5 E-5	5.0 E-5
4,4'-DDD	nd	nd	nd	nd	nd	5.5 E-7	4.9 E-6	2.2 E-6	4.0 E-6	2.1 E-6
4,4'-DDT	nd	nd	nd	nd	nd	3.8 E-7	3.4 E-6	1.5 E-6	2.8 E-6	1.4 E-6

TABLE 3-13
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	7.4 E-5	6.7 E-4	2.9 E-4	5.4 E-4	2.8 E-4
gamma-Chlordane	nd	nd	nd	nd	nd	7.7 E-5	7.0 E-4	3.1 E-4	5.6 E-4	2.9 E-4
Aroclor-1248	nd	nd	nd	nd	nd	5.4 E-6	4.9 E-5	2.1 E-5	3.9 E-5	2.0 E-5
Aroclor-1260	nd	nd	nd	nd	nd	8.3 E-6	7.5 E-5	3.3 E-5	6.0 E-5	3.1 E-5
Hexachlorobenzene	nd	nd	nd	nd	nd	1.2 E-2	1.1 E-1	4.9 E-2	9.0 E-2	4.7 E-2
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	3.0 E-2	2.7 E-1	1.2 E-1	2.2 E-1	1.1 E-1
Hexachlorobutadiene	nd	nd	nd	nd	nd	1.8 E-3	1.6 E-2	7.1 E-3	1.3 E-2	6.8 E-3
Octachlorocyclopentene	nd	nd	nd	nd	nd	1.6 E-1	1.4 E+0	6.3 E-1	1.2 E+0	6.0 E-1
Heptachloronorborene	nd	nd	nd	nd	nd	1.7 E-2	1.6 E-1	6.9 E-2	1.3 E-1	6.5 E-2
Chlordene	nd	nd	nd	nd	nd	8.3 E-3	7.5 E-2	3.3 E-2	6.0 E-2	3.1 E-2
2,3,7,8-TCDD	nd	nd	nd	nd	nd	1.4 E-11	1.3 E-10	5.5 E-11	1.0 E-10	5.2 E-11
Total TETRA CDD	nd	nd	nd	nd	nd	2.0 E-11	1.8 E-10	7.9 E-11	1.4 E-10	7.5 E-11
Total PENTA CDD	nd	nd	nd	nd	nd	4.7 E-11	4.2 E-10	1.8 E-10	3.4 E-10	1.8 E-10
Total HEXA CDD	nd	nd	nd	nd	nd	5.1 E-11	4.6 E-10	2.0 E-10	3.7 E-10	1.9 E-10
Total HEPTA CDD	nd	nd	nd	nd	nd	1.6 E-10	1.4 E-9	6.2 E-10	1.1 E-9	5.9 E-10
Total OCTA CDD	nd	nd	nd	nd	nd	1.2 E-9	1.1 E-8	4.8 E-9	8.8 E-9	4.6 E-9
2,3,7,8-TCDF	nd	nd	nd	nd	nd	1.2 E-11	1.1 E-10	4.6 E-11	8.5 E-11	4.4 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	2.6 E-10	2.4 E-9	1.0 E-9	1.9 E-9	9.8 E-10
Total PENTA CDF	nd	nd	nd	nd	nd	3.5 E-10	3.2 E-9	1.4 E-9	2.6 E-9	1.3 E-9
Total HEXA CDF	nd	nd	nd	nd	nd	3.8 E-10	3.5 E-9	1.5 E-9	2.8 E-9	1.4 E-9
Total HEPTA CDF	nd	nd	nd	nd	nd	8.9 E-10	8.0 E-9	3.5 E-9	6.4 E-9	3.3 E-9
Total OCTA CDF	nd	nd	nd	nd	nd	1.0 E-9	9.3 E-9	4.1 E-9	7.4 E-9	3.9 E-9

nd = not detected or not calculated

TABLE 3-14
ESTIMATED CARCINOGENIC INTAKES FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
Antimony	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd
Thallium	nd	nd	nd	nd	nd	nd
Tin	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd
Methylene Chloride	2.1 E-9	3.9 E-9	2.5 E-10	1.7 E-6	3.2 E-6	2.0 E-7
Acetone	nd	nd	nd	nd	nd	nd
Chloroform	nd	nd	nd	1.1 E-5	2.0 E-5	1.3 E-6
1,2-Dichloroethane	nd	nd	nd	6.9 E-5	1.3 E-4	8.1 E-6
2-Butanone	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	nd	nd	nd	5.3 E-5	9.8 E-5	6.2 E-6
1,2-Dichloropropane	nd	nd	nd	1.1 E-4	2.1 E-4	1.3 E-5
Trichloroethene	nd	nd	nd	4.6 E-5	8.6 E-5	5.4 E-6
1,1,2-Trichloroethane	nd	nd	nd	1.2 E-4	2.3 E-4	1.4 E-5
Benzene	nd	nd	nd	2.0 E-5	3.7 E-5	2.3 E-6
Tetrachloroethene	nd	nd	nd	1.4 E-5	2.7 E-5	1.7 E-6
1,1,2,2-Tetrachloroethane	nd	nd	nd	4.3 E-5	8.0 E-5	5.0 E-6
Toluene	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd
Phenol	nd	nd	nd	nd	nd	nd
bis(2-Chloroethyl)Ether	nd	nd	nd	2.1 E-6	3.9 E-6	2.4 E-7
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	nd	nd	nd	6.2 E-6	1.2 E-5	7.3 E-7
Benzyl Alcohol	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	nd
2-Methylphenol	nd	nd	nd	nd	nd	nd

TABLE 3-14
ESTIMATED CARCINOGENIC INTAKES FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
4-Methylphenol	nd	nd	nd	nd	nd	nd
Hexachloroethane	nd	nd	nd	2.2 E-6	4.0 E-6	2.5 E-7
Benzoic Acid	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd
Dimethyl Phthalate	nd	nd	nd	nd	nd	nd
Acenaphthylene	nd	nd	nd	nd	nd	nd
Acenaphthene	nd	nd	nd	nd	nd	nd
Dibenzofuran	nd	nd	nd	nd	nd	nd
Fluorene	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	nd	nd	nd	2.1 E-6	3.9 E-6	2.5 E-7
Chrysene	nd	nd	nd	2.4 E-6	4.5 E-6	2.8 E-7
bis(2-Ethylhexyl)Phthalate	5.3 E-8	9.8 E-8	6.2 E-9	6.9 E-6	1.3 E-5	8.1 E-7
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	nd	nd	nd	2.2 E-6	4.2 E-6	2.6 E-7
Benzo(k)Fluoranthene	nd	nd	nd	1.6 E-6	3.1 E-6	1.9 E-7
Benzo(a)Pyrene	nd	nd	nd	2.3 E-6	4.3 E-6	2.7 E-7
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	1.1 E-6	2.1 E-6	1.3 E-7
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd
beta-BHC	nd	nd	nd	3.2 E-9	5.9 E-9	3.7 E-10
Heptachlor	nd	nd	nd	4.5 E-6	8.4 E-6	5.3 E-7
Aldrin	nd	nd	nd	1.4 E-6	2.5 E-6	1.6 E-7
Dieldrin	nd	nd	nd	6.2 E-7	1.2 E-6	7.3 E-8
4,4'-DDD	nd	nd	nd	2.6 E-8	4.8 E-8	3.0 E-9
4,4'-DDT	nd	nd	nd	1.8 E-8	3.4 E-8	2.1 E-9

TABLE 3-14
ESTIMATED CARCINOGENIC INTAKES FROM INGESTION OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
gamma-Chlordane	nd	nd	nd	nd	nd	3.7 E-6	1.3 E-5	6.8 E-6	7.9 E-7	4.3 E-7
Aroclor-1248	nd	nd	nd	nd	nd	2.6 E-7	8.9 E-7	4.8 E-7	5.5 E-8	3.0 E-8
Aroclor-1260	nd	nd	nd	nd	nd	3.9 E-7	1.4 E-6	7.3 E-7	8.5 E-8	4.6 E-8
Hexachlorobenzene	nd	nd	nd	nd	nd	5.9 E-4	2.0 E-3	1.1 E-3	1.3 E-4	6.9 E-5
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	nd	nd	nd	nd	nd	8.5 E-5	3.0 E-4	1.6 E-4	1.8 E-5	1.0 E-5
Octachlorocyclopentene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlordene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,3,7,8-TCDD	nd	nd	nd	nd	nd	6.6 E-13	2.3 E-12	1.2 E-12	1.4 E-13	7.7 E-14
Total TETRA CDD	nd	nd	nd	nd	nd	9.5 E-13	3.3 E-12	1.8 E-12	2.0 E-13	1.1 E-13
Total PENTA CDD	nd	nd	nd	nd	nd	2.2 E-12	7.6 E-12	4.1 E-12	4.8 E-13	2.6 E-13
Total HEXA CDD	nd	nd	nd	nd	nd	2.4 E-12	8.4 E-12	4.5 E-12	5.3 E-13	2.9 E-13
Total HEPTA CDD	nd	nd	nd	nd	nd	7.5 E-12	2.6 E-11	1.4 E-11	1.6 E-12	8.8 E-13
Total OCTA CDD	nd	nd	nd	nd	nd	5.8 E-11	2.0 E-10	1.1 E-10	1.2 E-11	6.8 E-12
2,3,7,8-TCDF	nd	nd	nd	nd	nd	5.6 E-13	1.9 E-12	1.0 E-12	1.2 E-13	6.5 E-14
Total TETRA CDF	nd	nd	nd	nd	nd	1.2 E-11	4.3 E-11	2.3 E-11	2.7 E-12	1.5 E-12
Total PENTA CDF	nd	nd	nd	nd	nd	1.7 E-11	5.8 E-11	3.1 E-11	3.6 E-12	2.0 E-12
Total HEXA CDF	nd	nd	nd	nd	nd	1.8 E-11	6.3 E-11	3.4 E-11	3.9 E-12	2.1 E-12
Total HEPTA CDF	nd	nd	nd	nd	nd	4.2 E-11	1.5 E-10	7.9 E-11	9.1 E-12	5.0 E-12
Total OCTA CDF	nd	nd	nd	nd	nd	4.9 E-11	1.7 E-10	9.1 E-11	1.0 E-11	5.7 E-12

nd = not detected or not calculated

TABLE 3-15
ESTIMATED CARCINOGENIC INTAKES FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
Antimony	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd
Thallium	nd	nd	nd	nd	nd	nd
Tin	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd
Methylene Chloride	6.9 E-8	1.8 E-7	1.8 E-7	5.7 E-5	1.5 E-4	1.5 E-4
Acetone	nd	nd	nd	nd	nd	nd
Chloroform	nd	nd	nd	3.6 E-4	9.2 E-4	9.2 E-4
1,2-Dichloroethane	nd	nd	nd	2.3 E-3	5.8 E-3	5.8 E-3
2-Butanone	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	nd	nd	nd	1.7 E-3	4.5 E-3	4.5 E-3
1,2-Dichloropropane	nd	nd	nd	3.7 E-3	9.5 E-3	9.5 E-3
Trichloroethene	nd	nd	nd	1.5 E-3	3.9 E-3	3.9 E-3
1,1,2-Trichloroethane	nd	nd	nd	4.0 E-3	1.0 E-2	1.0 E-2
Benzene	nd	nd	nd	6.5 E-4	1.7 E-3	1.7 E-3
Tetrachloroethene	nd	nd	nd	4.8 E-4	1.2 E-3	1.2 E-3
1,1,2,2-Tetrachloroethane	nd	nd	nd	1.4 E-3	3.6 E-3	3.6 E-3
Toluene	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd
Phenol	nd	nd	nd	nd	nd	nd
bis(2-Chloroethyl)Ether	nd	nd	nd	2.7 E-5	7.0 E-5	7.0 E-5
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	nd	nd	nd	8.2 E-5	2.1 E-4	2.1 E-4
Benzyl Alcohol	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	nd
2-Methylphenol	nd	nd	nd	nd	nd	nd

TABLE 3-15
ESTIMATED CARCINOGENIC INTAKES FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
4-Methylphenol	nd	nd	nd	nd	nd	nd
Hexachloroethane	nd	nd	nd	2.8 E-5	7.3 E-5	7.3 E-5
Benzoic Acid	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd
Dimethyl Phthalate	nd	nd	nd	nd	nd	nd
Acenaphthylene	nd	nd	nd	nd	nd	nd
Acenaphthene	nd	nd	nd	nd	nd	nd
Dibenzofuran	nd	nd	nd	nd	nd	nd
Fluorene	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	nd	nd	nd	2.8 E-5	7.2 E-5	7.2 E-5
Chrysene	nd	nd	nd	3.2 E-5	8.2 E-5	8.2 E-5
bis(2-Ethylhexyl)Phthalate	6.9 E-7	1.8 E-6	1.8 E-6	9.1 E-5	2.3 E-4	2.3 E-4
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	nd	nd	nd	3.0 E-5	7.6 E-5	7.6 E-5
Benzo(k)Fluoranthene	nd	nd	nd	2.2 E-5	5.6 E-5	5.6 E-5
Benzo(a)Pyrene	nd	nd	nd	3.0 E-5	7.8 E-5	7.8 E-5
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	1.5 E-5	3.8 E-5	3.8 E-5
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd
beta-BHC	nd	nd	nd	4.2 E-8	1.1 E-7	1.1 E-7
Heptachlor	nd	nd	nd	5.9 E-5	1.5 E-4	1.5 E-4
Aldrin	nd	nd	nd	1.8 E-5	4.6 E-5	4.6 E-5
Dieldrin	nd	nd	nd	8.2 E-6	2.1 E-5	2.1 E-5
4,4'-DDD	nd	nd	nd	3.4 E-7	8.8 E-7	8.8 E-7
4,4'-DDT	nd	nd	nd	2.4 E-7	6.1 E-7	6.1 E-7

TABLE 3-15
ESTIMATED CARCINOGENIC INTAKES FROM DERMAL CONTACT WITH WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
gamma-Chlordane	nd	nd	nd	nd	nd	4.8 E-5	4.7 E-5	1.2 E-4	4.7 E-5	1.2 E-4
Aroclor-1248	nd	nd	nd	nd	nd	3.4 E-6	3.3 E-6	8.7 E-6	3.3 E-6	8.7 E-6
Aroclor-1260	nd	nd	nd	nd	nd	5.2 E-6	5.1 E-6	1.3 E-5	5.1 E-6	1.3 E-5
Hexachlorobenzene	nd	nd	nd	nd	nd	7.8 E-3	7.6 E-3	2.0 E-2	7.6 E-3	2.0 E-2
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	nd	nd	nd	nd	nd	1.1 E-3	1.1 E-3	2.9 E-3	1.1 E-3	2.9 E-3
Octachlorocyclopentene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlordene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,3,7,8-TCDD	nd	nd	nd	nd	nd	8.7 E-12	8.5 E-12	2.2 E-11	8.5 E-12	2.2 E-11
Total TETRA CDD	nd	nd	nd	nd	nd	1.2 E-11	1.2 E-11	3.2 E-11	1.2 E-11	3.2 E-11
Total PENTA CDD	nd	nd	nd	nd	nd	2.9 E-11	2.8 E-11	7.5 E-11	2.8 E-11	7.5 E-11
Total HEXA CDD	nd	nd	nd	nd	nd	3.2 E-11	3.1 E-11	8.2 E-11	3.1 E-11	8.2 E-11
Total HEPTA CDD	nd	nd	nd	nd	nd	9.8 E-11	9.6 E-11	2.5 E-10	9.6 E-11	2.5 E-10
Total OCTA CDD	nd	nd	nd	nd	nd	7.6 E-10	7.4 E-10	2.0 E-9	7.4 E-10	2.0 E-9
2,3,7,8-TCDF	nd	nd	nd	nd	nd	7.3 E-12	7.2 E-12	1.9 E-11	7.2 E-12	1.9 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	1.6 E-10	1.6 E-10	4.2 E-10	1.6 E-10	4.2 E-10
Total PENTA CDF	nd	nd	nd	nd	nd	2.2 E-10	2.2 E-10	5.7 E-10	2.2 E-10	5.7 E-10
Total HEXA CDF	nd	nd	nd	nd	nd	2.4 E-10	2.3 E-10	6.2 E-10	2.3 E-10	6.2 E-10
Total HEPTA CDF	nd	nd	nd	nd	nd	5.6 E-10	5.4 E-10	1.4 E-9	5.4 E-10	1.4 E-9
Total OCTA CDF	nd	nd	nd	nd	nd	6.4 E-10	6.3 E-10	1.6 E-9	6.3 E-10	1.6 E-9

nd = not detected or not calculated

TABLE 3-16
ESTIMATED TOTAL CARCINOGENIC INTAKES FROM OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
Antimony	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd
Thallium	nd	nd	nd	nd	nd	nd
Tin	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd
Methylene Chloride	7.1 E-8	1.8 E-7	1.8 E-7	5.9 E-5	1.5 E-4	1.5 E-4
Acetone	nd	nd	nd	nd	nd	nd
Chloroform	nd	nd	nd	3.7 E-4	9.4 E-4	9.2 E-4
1,2-Dichloroethane	nd	nd	nd	2.3 E-3	6.0 E-3	5.9 E-3
2-Butanone	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	nd	nd	nd	nd	nd	nd
Carbon Tetrachloride	nd	nd	nd	1.8 E-3	4.6 E-3	4.5 E-3
1,2-Dichloropropane	nd	nd	nd	3.8 E-3	9.7 E-3	9.5 E-3
Trichloroethene	nd	nd	nd	1.6 E-3	4.0 E-3	3.9 E-3
1,1,2-Trichloroethane	nd	nd	nd	4.1 E-3	1.1 E-2	1.0 E-2
Benzene	nd	nd	nd	6.7 E-4	1.7 E-3	1.7 E-3
Tetrachloroethene	nd	nd	nd	4.9 E-4	1.3 E-3	1.2 E-3
1,1,2,2-Tetrachloroethane	nd	nd	nd	1.4 E-3	3.7 E-3	3.6 E-3
Toluene	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd
Phenol	nd	nd	nd	nd	nd	nd
bis(2-Chloroethyl)Ether	nd	nd	nd	2.9 E-5	7.4 E-5	7.1 E-5
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	nd	nd	nd	8.8 E-5	2.2 E-4	2.1 E-4
Benzyl Alcohol	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	nd	nd	nd	nd	nd	nd
2-Methylphenol	nd	nd	nd	nd	nd	nd

TABLE 3-16
ESTIMATED TOTAL CARCINOGENIC INTAKES FROM OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)			Future (with Residential Development)		
	Occupational Adult	Residential Adult	Recreational Adult	Occupational Adult	Residential Adult	Recreational Adult
4-Methylphenol	nd	nd	nd	nd	nd	nd
Hexachloroethane	nd	nd	nd	3.1 E-5	7.7 E-5	7.3 E-5
Benzoic Acid	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd
Dimethyl Phthalate	nd	nd	nd	nd	nd	nd
Acenaphthylene	nd	nd	nd	nd	nd	nd
Acenaphthene	nd	nd	nd	nd	nd	nd
Dibenzofuran	nd	nd	nd	nd	nd	nd
Fluorene	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	nd	nd	nd	3.0 E-5	7.6 E-5	7.2 E-5
Chrysene	nd	nd	nd	3.4 E-5	8.6 E-5	8.2 E-5
bis(2-Ethylhexyl)Phthalate	7.4 E-7	1.9 E-6	1.8 E-6	9.7 E-5	2.5 E-4	2.3 E-4
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	nd	nd	nd	3.2 E-5	8.0 E-5	7.6 E-5
Benzo(k)Fluoranthene	nd	nd	nd	2.3 E-5	5.9 E-5	5.6 E-5
Benzo(a)Pyrene	nd	nd	nd	3.3 E-5	8.2 E-5	7.8 E-5
Indeno(1,2,3-cd)Pyrene	nd	nd	nd	1.6 E-5	4.0 E-5	3.8 E-5
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd
beta-BHC	nd	nd	nd	4.5 E-8	1.1 E-7	1.1 E-7
Heptachlor	nd	nd	nd	6.4 E-5	1.6 E-4	1.5 E-4
Aldrin	nd	nd	nd	1.9 E-5	4.9 E-5	4.6 E-5
Dieldrin	nd	nd	nd	8.8 E-6	2.2 E-5	2.1 E-5
4,4'-DDD	nd	nd	nd	3.7 E-7	9.3 E-7	8.8 E-7
4,4'-DDT	nd	nd	nd	2.6 E-7	6.5 E-7	6.1 E-7

TABLE 3-16
ESTIMATED TOTAL CARCINOGENIC INTAKES FROM OF WASTE LAGOON SOILS
(mg/kg/day)

Chemical	Current & Future (No Residential Development)					Future (with Residential Development)				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Endrin ketone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
gamma-Chlordane	nd	nd	nd	nd	nd	5.2 E-5	6.0 E-5	1.3 E-4	4.8 E-5	1.2 E-4
Aroclor-1248	nd	nd	nd	nd	nd	3.6 E-6	4.2 E-6	9.2 E-6	3.4 E-6	8.7 E-6
Aroclor-1260	nd	nd	nd	nd	nd	5.6 E-6	6.4 E-6	1.4 E-5	5.2 E-6	1.3 E-5
Hexachlorobenzene	nd	nd	nd	nd	nd	8.4 E-3	9.7 E-3	2.1 E-2	7.7 E-3	2.0 E-2
Hexachlorocyclopentadiene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachlorobutadiene	nd	nd	nd	nd	nd	1.2 E-3	1.4 E-3	3.1 E-3	1.1 E-3	2.9 E-3
Octachlorocyclopentene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlordene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,3,7,8-TCDD	nd	nd	nd	nd	nd	9.3 E-12	1.1 E-11	2.4 E-11	8.6 E-12	2.2 E-11
Total TETRA CDD	nd	nd	nd	nd	nd	1.3 E-11	1.5 E-11	3.4 E-11	1.2 E-11	3.2 E-11
Total PENTA CDD	nd	nd	nd	nd	nd	3.1 E-11	3.6 E-11	7.9 E-11	2.9 E-11	7.5 E-11
Total HEXA CDD	nd	nd	nd	nd	nd	3.4 E-11	4.0 E-11	8.7 E-11	3.2 E-11	8.3 E-11
Total HEPTA CDD	nd	nd	nd	nd	nd	1.1 E-10	1.2 E-10	2.7 E-10	9.8 E-11	2.5 E-10
Total OCTA CDD	nd	nd	nd	nd	nd	8.2 E-10	9.4 E-10	2.1 E-9	7.6 E-10	2.0 E-9
2,3,7,8-TCDF	nd	nd	nd	nd	nd	7.9 E-12	9.1 E-12	2.0 E-11	7.3 E-12	1.9 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	1.8 E-10	2.0 E-10	4.4 E-10	1.6 E-10	4.2 E-10
Total PENTA CDF	nd	nd	nd	nd	nd	2.4 E-10	2.7 E-10	6.0 E-10	2.2 E-10	5.7 E-10
Total HEXA CDF	nd	nd	nd	nd	nd	2.6 E-10	3.0 E-10	6.5 E-10	2.4 E-10	6.2 E-10
Total HEPTA CDF	nd	nd	nd	nd	nd	6.0 E-10	6.9 E-10	1.5 E-9	5.5 E-10	1.4 E-9
Total OCTA CDF	nd	nd	nd	nd	nd	6.9 E-10	7.9 E-10	1.7 E-9	6.4 E-10	1.7 E-9

nd = not detected or not calculated

TABLE 3-17

ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	3.5 E-6	9.5 E-5	1.0 E-5	6.0 E-6	6.5 E-7	3.3 E-6	9.0 E-5	9.8 E-6	5.7 E-6	6.1 E-7
Cadmium	1.1 E-6	2.9 E-5	3.2 E-6	1.8 E-6	2.0 E-7	6.1 E-7	1.7 E-5	1.8 E-6	1.0 E-6	1.1 E-7
Chromium	1.2 E-5	3.3 E-4	3.6 E-5	2.1 E-5	2.2 E-6	1.1 E-5	3.1 E-4	3.3 E-5	1.9 E-5	2.1 E-6
Copper	2.1 E-5	5.7 E-4	6.1 E-5	3.5 E-5	3.9 E-6	1.7 E-5	4.7 E-4	5.1 E-5	2.9 E-5	3.2 E-6
Lead	7.1 E-5	1.9 E-3	2.1 E-4	1.2 E-4	1.3 E-5	4.4 E-5	1.2 E-3	1.3 E-4	7.4 E-5	8.0 E-6
Silver	1.4 E-6	3.8 E-5	4.1 E-6	2.4 E-6	2.6 E-7	9.9 E-7	2.7 E-5	2.9 E-6	1.7 E-6	1.8 E-7
Zinc	1.4 E-4	3.8 E-3	4.1 E-4	2.4 E-4	2.6 E-5	9.4 E-5	2.5 E-3	2.7 E-4	1.6 E-4	1.7 E-5
Cyanide	4.7 E-7	1.3 E-5	1.4 E-6	7.9 E-7	8.6 E-8	3.7 E-7	1.0 E-5	1.1 E-6	6.3 E-7	6.9 E-8
Methylene Chloride	1.5 E-8	3.9 E-7	4.2 E-8	2.5 E-8	2.7 E-9	1.2 E-7	3.3 E-6	3.6 E-7	2.1 E-7	2.3 E-8
Acetone	1.1 E-8	3.1 E-7	3.3 E-8	1.9 E-8	2.1 E-9	1.3 E-7	3.5 E-6	3.7 E-7	2.2 E-7	2.3 E-8
2-Butanone	7.1 E-9	1.9 E-7	2.1 E-8	1.2 E-8	1.3 E-9	2.2 E-8	6.0 E-7	6.4 E-8	3.7 E-8	4.1 E-9
Benzene	1.1 E-9	2.9 E-8	3.1 E-9	1.8 E-9	2.0 E-10	1.1 E-9	2.9 E-8	3.1 E-9	1.8 E-9	2.0 E-10
Tetrachloroethene	4.1 E-9	1.1 E-7	1.2 E-8	7.0 E-9	7.6 E-10	1.9 E-7	5.1 E-6	5.5 E-7	3.2 E-7	3.5 E-8
Toluene	2.2 E-9	5.9 E-8	6.4 E-9	3.7 E-9	4.0 E-10	3.2 E-8	8.7 E-7	9.4 E-8	5.5 E-8	5.9 E-9
Chlorobenzene	9.8 E-10	2.6 E-8	2.9 E-9	1.7 E-9	1.8 E-10	9.8 E-10	2.6 E-8	2.9 E-9	1.7 E-9	1.8 E-10
Ethylbenzene	4.9 E-10	1.3 E-8	1.4 E-9	8.3 E-10	9.0 E-11	9.8 E-10	2.6 E-8	2.9 E-9	1.7 E-9	1.8 E-10
Xylene (total)	2.9 E-9	7.8 E-8	8.5 E-9	4.9 E-9	5.3 E-10	7.8 E-9	2.1 E-7	2.3 E-8	1.3 E-8	1.4 E-9
4-Methylphenol	6.8 E-8	1.9 E-6	2.0 E-7	1.2 E-7	1.3 E-8	6.8 E-8	1.9 E-6	2.0 E-7	1.2 E-7	1.3 E-8
Naphthalene	nd	nd	nd	nd	nd	1.1 E-7	2.9 E-6	3.1 E-7	1.8 E-7	2.0 E-8
2-Methylnaphthalene	nd	nd	nd	nd	nd	3.1 E-8	8.5 E-7	9.1 E-8	5.3 E-8	5.8 E-9
Diethylphthalate	nd	nd	nd	nd	nd	3.8 E-8	1.0 E-6	1.1 E-7	6.5 E-8	7.0 E-9
Phenanthrene	5.6 E-7	1.5 E-5	1.6 E-6	9.4 E-7	1.0 E-7	3.4 E-7	9.2 E-6	9.9 E-7	5.7 E-7	6.2 E-8
Anthracene	1.7 E-7	4.5 E-6	4.9 E-7	2.8 E-7	3.1 E-8	1.7 E-7	4.5 E-6	4.9 E-7	2.8 E-7	3.1 E-8
Di-n-Butylphthalate	2.4 E-7	6.5 E-6	7.0 E-7	4.1 E-7	4.4 E-8	2.2 E-7	6.0 E-6	6.4 E-7	3.7 E-7	4.0 E-8
Fluoranthene	6.8 E-7	1.8 E-5	2.0 E-6	1.2 E-6	1.3 E-7	4.2 E-7	1.1 E-5	1.2 E-6	7.2 E-7	7.8 E-8
Pyrene	6.7 E-7	1.8 E-5	2.0 E-6	1.1 E-6	1.2 E-7	4.1 E-7	1.1 E-5	1.2 E-6	7.0 E-7	7.6 E-8
Butylbenzylphthalate	5.0 E-7	1.3 E-5	1.4 E-6	8.4 E-7	9.1 E-8	3.1 E-7	8.4 E-6	9.1 E-7	5.3 E-7	5.7 E-8
Benzo(a)Anthracene	6.0 E-7	1.6 E-5	1.8 E-6	1.0 E-6	1.1 E-7	3.3 E-7	9.0 E-6	9.7 E-7	5.6 E-7	6.1 E-8
Chrysene	5.4 E-7	1.5 E-5	1.6 E-6	9.2 E-7	1.0 E-7	3.4 E-7	9.3 E-6	1.0 E-6	5.8 E-7	6.3 E-8
bis(2-Ethylhexyl)Phthalate	7.5 E-7	2.0 E-5	2.2 E-6	1.3 E-6	1.4 E-7	4.5 E-7	1.2 E-5	1.3 E-6	7.7 E-7	8.3 E-8

TABLE 3-17

ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	2.9 E-7	7.8 E-6	8.4 E-7	4.9 E-7	5.3 E-8	2.2 E-7	6.0 E-6	6.5 E-7	3.8 E-7	4.1 E-8
Benzo(b)Fluoranthene	8.2 E-7	2.2 E-5	2.4 E-6	1.4 E-6	1.5 E-7	4.4 E-7	1.2 E-5	1.3 E-6	7.4 E-7	8.0 E-8
Benzo(k)Fluoranthene	2.7 E-7	7.4 E-6	8.0 E-7	4.6 E-7	5.0 E-8	2.2 E-7	6.0 E-6	6.5 E-7	3.7 E-7	4.1 E-8
Benzo(a)Pyrene	4.6 E-7	1.2 E-5	1.3 E-6	7.7 E-7	8.4 E-8	3.1 E-7	8.4 E-6	9.1 E-7	5.3 E-7	5.7 E-8
Indeno(1,2,3-cd)Pyrene	2.5 E-7	6.7 E-6	7.2 E-7	4.2 E-7	4.6 E-8	2.1 E-7	5.7 E-6	6.2 E-7	3.6 E-7	3.9 E-8
Benzo(g,h,i)Perylene	2.7 E-7	7.2 E-6	7.8 E-7	4.5 E-7	4.9 E-8	2.2 E-7	6.0 E-6	6.5 E-7	3.8 E-7	4.1 E-8
4,4'-DDE	nd	nd	nd	nd	nd	1.1 E-8	3.0 E-7	3.3 E-8	1.9 E-8	2.1 E-9
Endrin	9.3 E-8	2.5 E-6	2.7 E-7	1.6 E-7	1.7 E-8	2.8 E-8	7.6 E-7	8.2 E-8	4.8 E-8	5.2 E-9
4,4'-DDD	4.9 E-9	1.3 E-7	1.4 E-8	8.3 E-9	9.0 E-10	1.3 E-8	3.4 E-7	3.7 E-8	2.1 E-8	2.3 E-9
4,4'-DDT	6.4 E-9	1.7 E-7	1.9 E-8	1.1 E-8	1.2 E-9	1.2 E-8	3.3 E-7	3.6 E-8	2.1 E-8	2.3 E-9
Aroclor-1254	4.8 E-4	1.3 E-2	1.4 E-3	8.1 E-4	8.8 E-5	1.5 E-5	4.0 E-4	4.3 E-5	2.5 E-5	2.7 E-6
Hexachlorobenzene	1.1 E-5	3.0 E-4	3.3 E-5	1.9 E-5	2.1 E-6	1.1 E-5	3.0 E-4	3.3 E-5	1.9 E-5	2.1 E-6
Hexachlorobutadiene	2.0 E-9	5.4 E-8	5.9 E-9	3.4 E-9	3.7 E-10	2.0 E-9	5.4 E-8	5.9 E-9	3.4 E-9	3.7 E-10
Heptachloronorborene	1.3 E-9	3.6 E-8	3.9 E-9	2.2 E-9	2.4 E-10	8.5 E-10	2.3 E-8	2.5 E-9	1.4 E-9	1.6 E-10
Total HEPTA CDD	1.0 E-10	2.7 E-9	2.9 E-10	1.7 E-10	1.8 E-11	3.3 E-12	9.0 E-11	9.8 E-12	5.7 E-12	6.1 E-13
Total OCTA CDD	9.4 E-11	2.5 E-9	2.7 E-10	1.6 E-10	1.7 E-11	6.1 E-13	1.7 E-11	1.8 E-12	1.0 E-12	1.1 E-13
2,3,7,8-TCDD	nd	nd	nd	nd	nd	3.9 E-12	1.1 E-10	1.1 E-11	6.6 E-12	7.2 E-13
Total TETRA CDF	nd	nd	nd	nd	nd	3.9 E-12	1.1 E-10	1.1 E-11	6.6 E-12	7.2 E-13

nd = not detected or not calculated

TABLE 3-18

ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	4.6 E-6	3.6 E-5	1.9 E-5	3.6 E-5	1.9 E-5	4.4 E-6	3.4 E-5	1.8 E-5	3.4 E-5	1.8 E-5
Cadmium	1.4 E-6	1.1 E-5	5.8 E-6	1.1 E-5	5.8 E-6	8.1 E-7	6.2 E-6	3.3 E-6	6.2 E-6	3.3 E-6
Chromium	1.6 E-5	1.2 E-4	6.5 E-5	1.2 E-4	6.5 E-5	1.5 E-5	1.1 E-4	6.0 E-5	1.1 E-4	6.0 E-5
Copper	2.8 E-5	2.1 E-4	1.1 E-4	2.1 E-4	1.1 E-4	2.3 E-5	1.8 E-4	9.2 E-5	1.8 E-4	9.2 E-5
Lead	9.4 E-5	7.2 E-4	3.8 E-4	7.2 E-4	3.8 E-4	5.7 E-5	4.4 E-4	2.3 E-4	4.4 E-4	2.3 E-4
Silver	1.9 E-6	1.4 E-5	7.5 E-6	1.4 E-5	7.5 E-6	1.3 E-6	1.0 E-5	5.3 E-6	1.0 E-5	5.3 E-6
Zinc	1.8 E-4	1.4 E-3	7.4 E-4	1.4 E-3	7.4 E-4	1.2 E-4	9.5 E-4	5.0 E-4	9.5 E-4	5.0 E-4
Cyanide	6.2 E-7	4.7 E-6	2.5 E-6	4.7 E-6	2.5 E-6	4.9 E-7	3.8 E-6	2.0 E-6	3.8 E-6	2.0 E-6
Methylene Chloride	4.8 E-7	3.7 E-6	1.9 E-6	3.7 E-6	1.9 E-6	4.0 E-6	3.1 E-5	1.6 E-5	3.1 E-5	1.6 E-5
Acetone	3.7 E-7	2.9 E-6	1.5 E-6	2.9 E-6	1.5 E-6	4.2 E-6	3.2 E-5	1.7 E-5	3.2 E-5	1.7 E-5
2-Butanone	2.3 E-7	1.8 E-6	9.4 E-7	1.8 E-6	9.4 E-7	7.2 E-7	5.6 E-6	2.9 E-6	5.6 E-6	2.9 E-6
Benzene	3.5 E-8	2.7 E-7	1.4 E-7	2.7 E-7	1.4 E-7	3.5 E-8	2.7 E-7	1.4 E-7	2.7 E-7	1.4 E-7
Tetrachloroethene	1.4 E-7	1.0 E-6	5.5 E-7	1.0 E-6	5.5 E-7	6.2 E-6	4.8 E-5	2.5 E-5	4.8 E-5	2.5 E-5
Toluene	7.2 E-8	5.5 E-7	2.9 E-7	5.5 E-7	2.9 E-7	1.1 E-6	8.2 E-6	4.3 E-6	8.2 E-6	4.3 E-6
Chlorobenzene	3.2 E-8	2.5 E-7	1.3 E-7	2.5 E-7	1.3 E-7	3.2 E-8	2.5 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Ethylbenzene	1.6 E-8	1.2 E-7	6.5 E-8	1.2 E-7	6.5 E-8	3.2 E-8	2.5 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Xylene (total)	9.5 E-8	7.3 E-7	3.8 E-7	7.3 E-7	3.8 E-7	2.6 E-7	2.0 E-6	1.0 E-6	2.0 E-6	1.0 E-6
4-Methylphenol	9.0 E-7	6.9 E-6	3.6 E-6	6.9 E-6	3.6 E-6	9.0 E-7	6.9 E-6	3.6 E-6	6.9 E-6	3.6 E-6
Naphthalene	nd	nd	nd	nd	nd	1.4 E-6	1.1 E-5	5.7 E-6	1.1 E-5	5.7 E-6
2-Methylnaphthalene	nd	nd	nd	nd	nd	4.1 E-7	3.2 E-6	1.7 E-6	3.2 E-6	1.7 E-6
Diethylphthalate	nd	nd	nd	nd	nd	5.0 E-7	3.9 E-6	2.0 E-6	3.9 E-6	2.0 E-6
Phenanthrene	7.4 E-6	5.6 E-5	3.0 E-5	5.6 E-5	3.0 E-5	4.5 E-6	3.4 E-5	1.8 E-5	3.4 E-5	1.8 E-5
Anthracene	2.2 E-6	1.7 E-5	8.8 E-6	1.7 E-5	8.8 E-6	2.2 E-6	1.7 E-5	8.8 E-6	1.7 E-5	8.8 E-6
Di-n-Butylphthalate	3.2 E-6	2.4 E-5	1.3 E-5	2.4 E-5	1.3 E-5	2.9 E-6	2.2 E-5	1.2 E-5	2.2 E-5	1.2 E-5
Fluoranthene	9.0 E-6	6.9 E-5	3.6 E-5	6.9 E-5	3.6 E-5	5.6 E-6	4.3 E-5	2.2 E-5	4.3 E-5	2.2 E-5
Pyrene	8.9 E-6	6.8 E-5	3.6 E-5	6.8 E-5	3.6 E-5	5.5 E-6	4.2 E-5	2.2 E-5	4.2 E-5	2.2 E-5
Butylbenzylphthalate	6.5 E-6	5.0 E-5	2.6 E-5	5.0 E-5	2.6 E-5	4.1 E-6	3.1 E-5	1.7 E-5	3.1 E-5	1.7 E-5
Benzo(a)Anthracene	7.9 E-6	6.1 E-5	3.2 E-5	6.1 E-5	3.2 E-5	4.4 E-6	3.4 E-5	1.8 E-5	3.4 E-5	1.8 E-5
Chrysene	7.2 E-6	5.5 E-5	2.9 E-5	5.5 E-5	2.9 E-5	4.5 E-6	3.5 E-5	1.8 E-5	3.5 E-5	1.8 E-5
bis(2-Ethylhexyl)Phthalate	9.9 E-6	7.6 E-5	4.0 E-5	7.6 E-5	4.0 E-5	6.0 E-6	4.6 E-5	2.4 E-5	4.6 E-5	2.4 E-5

TABLE 3-18

ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	3.8 E-6	2.9 E-5	1.5 E-5	2.9 E-5	1.5 E-5	2.9 E-6	2.2 E-5	1.2 E-5	2.2 E-5	1.2 E-5
Benzo(b)Fluoranthene	1.1 E-5	8.3 E-5	4.4 E-5	8.3 E-5	4.4 E-5	5.7 E-6	4.4 E-5	2.3 E-5	4.4 E-5	2.3 E-5
Benzo(k)Fluoranthene	3.6 E-6	2.8 E-5	1.5 E-5	2.8 E-5	1.5 E-5	2.9 E-6	2.2 E-5	1.2 E-5	2.2 E-5	1.2 E-5
Benzo(a)Pyrene	6.0 E-6	4.6 E-5	2.4 E-5	4.6 E-5	2.4 E-5	4.1 E-6	3.1 E-5	1.7 E-5	3.1 E-5	1.7 E-5
Indeno(1,2,3-cd)Pyrene	3.3 E-6	2.5 E-5	1.3 E-5	2.5 E-5	1.3 E-5	2.8 E-6	2.1 E-5	1.1 E-5	2.1 E-5	1.1 E-5
Benzo(g,h,i)Perylene	3.5 E-6	2.7 E-5	1.4 E-5	2.7 E-5	1.4 E-5	2.9 E-6	2.2 E-5	1.2 E-5	2.2 E-5	1.2 E-5
4,4'-DDE	nd	nd	nd	nd	nd	1.5 E-7	1.1 E-6	5.9 E-7	1.1 E-6	5.9 E-7
Endrin	1.2 E-6	9.4 E-6	5.0 E-6	9.4 E-6	5.0 E-6	3.7 E-7	2.9 E-6	1.5 E-6	2.9 E-6	1.5 E-6
4,4'-DDD	6.4 E-8	4.9 E-7	2.6 E-7	4.9 E-7	2.6 E-7	1.6 E-7	1.3 E-6	6.6 E-7	1.3 E-6	6.6 E-7
4,4'-DDT	8.4 E-8	6.4 E-7	3.4 E-7	6.4 E-7	3.4 E-7	1.6 E-7	1.2 E-6	6.5 E-7	1.2 E-6	6.5 E-7
Aroclor-1254	6.3 E-3	4.8 E-2	2.5 E-2	4.8 E-2	2.5 E-2	1.9 E-4	1.5 E-3	7.8 E-4	1.5 E-3	7.8 E-4
Hexachlorobenzene	1.5 E-4	1.1 E-3	6.0 E-4	1.1 E-3	6.0 E-4	1.5 E-4	1.1 E-3	6.0 E-4	1.1 E-3	6.0 E-4
Hexachlorobutadiene	2.6 E-8	2.0 E-7	1.1 E-7	2.0 E-7	1.1 E-7	2.6 E-8	2.0 E-7	1.1 E-7	2.0 E-7	1.1 E-7
Heptachloronorborene	1.7 E-8	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8	1.1 E-8	8.5 E-8	4.5 E-8	8.5 E-8	4.5 E-8
Total HEPTA CDD	1.3 E-9	1.0 E-8	5.3 E-9	1.0 E-8	5.3 E-9	4.4 E-11	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10
Total OCTA CDD	1.2 E-9	9.5 E-9	5.0 E-9	9.5 E-9	5.0 E-9	8.1 E-12	6.2 E-11	3.3 E-11	6.2 E-11	3.3 E-11
2,3,7,8-TCDD	nd	nd	nd	nd	nd	5.2 E-11	4.0 E-10	2.1 E-10	4.0 E-10	2.1 E-10
Total TETRA CDF	nd	nd	nd	nd	nd	5.2 E-11	4.0 E-10	2.1 E-10	4.0 E-10	2.1 E-10

nd = not detected or not calculated

TABLE 3-19

ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	8.2 E-6	1.3 E-4	2.9 E-5	4.2 E-5	1.9 E-5	7.7 E-6	1.2 E-4	2.7 E-5	3.9 E-5	1.8 E-5
Cadmium	2.5 E-6	4.0 E-5	9.0 E-6	1.3 E-5	6.0 E-6	1.4 E-6	2.3 E-5	5.1 E-6	7.2 E-6	3.4 E-6
Chromium	2.8 E-5	4.5 E-4	1.0 E-4	1.4 E-4	6.7 E-5	2.6 E-5	4.2 E-4	9.3 E-5	1.3 E-4	6.2 E-5
Copper	4.9 E-5	7.8 E-4	1.7 E-4	2.5 E-4	1.2 E-4	4.0 E-5	6.5 E-4	1.4 E-4	2.0 E-4	9.6 E-5
Lead	1.7 E-4	2.7 E-3	5.9 E-4	8.4 E-4	3.9 E-4	1.0 E-4	1.6 E-3	3.6 E-4	5.1 E-4	2.4 E-4
Silver	3.3 E-6	5.2 E-5	1.2 E-5	1.7 E-5	7.8 E-6	2.3 E-6	3.7 E-5	8.1 E-6	1.2 E-5	5.4 E-6
Zinc	3.2 E-4	5.2 E-3	1.1 E-3	1.6 E-3	7.7 E-4	2.2 E-4	3.5 E-3	7.7 E-4	1.1 E-3	5.2 E-4
Cyanide	1.1 E-6	1.7 E-5	3.9 E-6	5.5 E-6	2.6 E-6	8.6 E-7	1.4 E-5	3.1 E-6	4.4 E-6	2.0 E-6
Methylene Chloride	4.9 E-7	4.1 E-6	2.0 E-6	3.7 E-6	1.9 E-6	4.2 E-6	3.4 E-5	1.7 E-5	3.1 E-5	1.6 E-5
Acetone	3.8 E-7	3.2 E-6	1.5 E-6	2.9 E-6	1.5 E-6	4.3 E-6	3.6 E-5	1.7 E-5	3.2 E-5	1.7 E-5
2-Butanone	2.4 E-7	2.0 E-6	9.6 E-7	1.8 E-6	9.4 E-7	7.5 E-7	6.2 E-6	3.0 E-6	5.6 E-6	2.9 E-6
Benzene	3.7 E-8	3.0 E-7	1.5 E-7	2.7 E-7	1.4 E-7	3.7 E-8	3.0 E-7	1.5 E-7	2.7 E-7	1.4 E-7
Tetrachloroethene	1.4 E-7	1.1 E-6	5.6 E-7	1.0 E-6	5.5 E-7	6.4 E-6	5.3 E-5	2.6 E-5	4.8 E-5	2.5 E-5
Toluene	7.4 E-8	6.1 E-7	3.0 E-7	5.5 E-7	2.9 E-7	1.1 E-6	9.0 E-6	4.4 E-6	8.2 E-6	4.3 E-6
Chlorobenzene	3.3 E-8	2.7 E-7	1.3 E-7	2.5 E-7	1.3 E-7	3.3 E-8	2.7 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Ethylbenzene	1.7 E-8	1.4 E-7	6.6 E-8	1.2 E-7	6.5 E-8	3.3 E-8	2.7 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Xylene (total)	9.8 E-8	8.1 E-7	3.9 E-7	7.4 E-7	3.9 E-7	2.7 E-7	2.2 E-6	1.1 E-6	2.0 E-6	1.0 E-6
4-Methylphenol	9.7 E-7	8.8 E-6	3.8 E-6	7.0 E-6	3.7 E-6	9.7 E-7	8.8 E-6	3.8 E-6	7.0 E-6	3.7 E-6
Naphthalene	nd	nd	nd	nd	nd	1.5 E-6	1.4 E-5	6.0 E-6	1.1 E-5	5.7 E-6
2-Methylnaphthalene	nd	nd	nd	nd	nd	4.4 E-7	4.0 E-6	1.8 E-6	3.2 E-6	1.7 E-6
Diethylphthalate	nd	nd	nd	nd	nd	5.4 E-7	4.9 E-6	2.1 E-6	3.9 E-6	2.0 E-6
Phenanthrene	7.9 E-6	7.1 E-5	3.1 E-5	5.7 E-5	3.0 E-5	4.8 E-6	4.3 E-5	1.9 E-5	3.5 E-5	1.8 E-5
Anthracene	2.4 E-6	2.1 E-5	9.3 E-6	1.7 E-5	8.9 E-6	2.4 E-6	2.1 E-5	9.3 E-6	1.7 E-5	8.9 E-6
Di-n-Butylphthalate	3.4 E-6	3.1 E-5	1.3 E-5	2.5 E-5	1.3 E-5	3.1 E-6	2.8 E-5	1.2 E-5	2.3 E-5	1.2 E-5
Fluoranthene	9.7 E-6	8.7 E-5	3.8 E-5	7.0 E-5	3.6 E-5	6.0 E-6	5.4 E-5	2.4 E-5	4.3 E-5	2.3 E-5
Pyrene	9.6 E-6	8.6 E-5	3.8 E-5	6.9 E-5	3.6 E-5	5.9 E-6	5.3 E-5	2.3 E-5	4.3 E-5	2.2 E-5
Butylbenzylphthalate	7.0 E-6	6.4 E-5	2.8 E-5	5.1 E-5	2.6 E-5	4.4 E-6	4.0 E-5	1.7 E-5	3.2 E-5	1.7 E-5
Benzo(a)Anthracene	8.5 E-6	7.7 E-5	3.4 E-5	6.2 E-5	3.2 E-5	4.7 E-6	4.3 E-5	1.9 E-5	3.4 E-5	1.8 E-5
Chrysene	7.7 E-6	7.0 E-5	3.1 E-5	5.6 E-5	2.9 E-5	4.9 E-6	4.4 E-5	1.9 E-5	3.5 E-5	1.8 E-5
bis(2-Ethylhexyl)Phthalate	1.1 E-5	9.6 E-5	4.2 E-5	7.7 E-5	4.0 E-5	6.4 E-6	5.8 E-5	2.5 E-5	4.7 E-5	2.4 E-5

TABLE 3-19

ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	4.1 E-6	3.7 E-5	1.6 E-5	2.9 E-5	1.5 E-5	3.2 E-6	2.8 E-5	1.2 E-5	2.3 E-5	1.2 E-5
Benzo(b)Fluoranthene	1.2 E-5	1.0 E-4	4.6 E-5	8.4 E-5	4.4 E-5	6.2 E-6	5.6 E-5	2.4 E-5	4.5 E-5	2.3 E-5
Benzo(k)Fluoranthene	3.9 E-6	3.5 E-5	1.5 E-5	2.8 E-5	1.5 E-5	3.1 E-6	2.8 E-5	1.2 E-5	2.3 E-5	1.2 E-5
Benzo(a)Pyrene	6.5 E-6	5.9 E-5	2.6 E-5	4.7 E-5	2.4 E-5	4.4 E-6	4.0 E-5	1.7 E-5	3.2 E-5	1.7 E-5
Indeno(1,2,3-cd)Pyrene	3.5 E-6	3.2 E-5	1.4 E-5	2.5 E-5	1.3 E-5	3.0 E-6	2.7 E-5	1.2 E-5	2.2 E-5	1.1 E-5
Benzo(g,h,i)Perylene	3.8 E-6	3.4 E-5	1.5 E-5	2.7 E-5	1.4 E-5	3.1 E-6	2.8 E-5	1.2 E-5	2.3 E-5	1.2 E-5
4,4'-DDE	nd	nd	nd	nd	nd	1.6 E-7	1.4 E-6	6.3 E-7	1.1 E-6	5.9 E-7
Endrin	1.3 E-6	1.2 E-5	5.2 E-6	9.6 E-6	5.0 E-6	4.0 E-7	3.6 E-6	1.6 E-6	2.9 E-6	1.5 E-6
4,4'-DDD	6.9 E-8	6.3 E-7	2.7 E-7	5.0 E-7	2.6 E-7	1.8 E-7	1.6 E-6	7.0 E-7	1.3 E-6	6.7 E-7
4,4'-DDT	9.0 E-8	8.1 E-7	3.6 E-7	6.5 E-7	3.4 E-7	1.7 E-7	1.6 E-6	6.9 E-7	1.3 E-6	6.5 E-7
Aroclor-1254	6.8 E-3	6.1 E-2	2.7 E-2	4.9 E-2	2.6 E-2	2.1 E-4	1.9 E-3	8.2 E-4	1.5 E-3	7.8 E-4
Hexachlorobenzene	1.6 E-4	1.4 E-3	6.3 E-4	1.2 E-3	6.0 E-4	1.6 E-4	1.4 E-3	6.3 E-4	1.2 E-3	6.0 E-4
Hexachlorobutadiene	2.8 E-8	2.6 E-7	1.1 E-7	2.1 E-7	1.1 E-7	2.8 E-8	2.6 E-7	1.1 E-7	2.1 E-7	1.1 E-7
Heptachloronorborene	1.9 E-8	1.7 E-7	7.4 E-8	1.4 E-7	7.0 E-8	1.2 E-8	1.1 E-7	4.7 E-8	8.7 E-8	4.5 E-8
Total HEPTA CDD	1.4 E-9	1.3 E-8	5.6 E-9	1.0 E-8	5.3 E-9	4.7 E-11	4.3 E-10	1.9 E-10	3.4 E-10	1.8 E-10
Total OCTA CDD	1.3 E-9	1.2 E-8	5.3 E-9	9.6 E-9	5.0 E-9	8.7 E-12	7.9 E-11	3.4 E-11	6.3 E-11	3.3 E-11
2,3,7,8-TCDD	nd	nd	nd	nd	nd	5.5 E-11	5.0 E-10	2.2 E-10	4.0 E-10	2.1 E-10
Total TETRA CDF	nd	nd	nd	nd	nd	5.5 E-11	5.0 E-10	2.2 E-10	4.0 E-10	2.1 E-10

nd = not detected or not calculated

TABLE 3-20

ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Copper	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Methylene Chloride	9.7 E-9	3.4 E-8	1.8 E-8	2.1 E-9	1.1 E-9	8.2 E-8	2.8 E-7	1.5 E-7	1.8 E-8	9.7 E-9
Acetone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Butanone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	7.2 E-10	2.5 E-9	1.3 E-9	1.6 E-10	8.5 E-11	7.2 E-10	2.5 E-9	1.3 E-9	1.6 E-10	8.5 E-11
Tetrachloroethene	2.8 E-9	9.5 E-9	5.1 E-9	6.0 E-10	3.2 E-10	1.3 E-7	4.4 E-7	2.4 E-7	2.7 E-8	1.5 E-8
Toluene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Methylphenol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diethylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	4.0 E-7	1.4 E-6	7.5 E-7	8.7 E-8	4.7 E-8	2.2 E-7	7.7 E-7	4.2 E-7	4.8 E-8	2.6 E-8
Chrysene	3.7 E-7	1.3 E-6	6.8 E-7	7.9 E-8	4.3 E-8	2.3 E-7	8.0 E-7	4.3 E-7	5.0 E-8	2.7 E-8
bis(2-Ethylhexyl)Phthalate	5.0 E-7	1.7 E-6	9.4 E-7	1.1 E-7	5.9 E-8	3.0 E-7	1.1 E-6	5.7 E-7	6.6 E-8	3.6 E-8

TABLE 3-20

ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	5.5 E-7	1.9 E-6	1.0 E-6	1.2 E-7	6.5 E-8	2.9 E-7	1.0 E-6	5.4 E-7	6.3 E-8	3.4 E-8
Benzo(k)Fluoranthene	1.8 E-7	6.4 E-7	3.4 E-7	4.0 E-8	2.2 E-8	1.5 E-7	5.1 E-7	2.8 E-7	3.2 E-8	1.7 E-8
Benzo(a)Pyrene	3.1 E-7	1.1 E-6	5.7 E-7	6.6 E-8	3.6 E-8	2.1 E-7	7.2 E-7	3.9 E-7	4.5 E-8	2.5 E-8
Indeno(1,2,3-cd)Pyrene	1.7 E-7	5.8 E-7	3.1 E-7	3.6 E-8	2.0 E-8	1.4 E-7	4.9 E-7	2.6 E-7	3.1 E-8	1.7 E-8
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	nd	nd	nd	nd	nd	7.5 E-9	2.6 E-8	1.4 E-8	1.6 E-9	8.8 E-10
Endrin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDD	3.3 E-9	1.1 E-8	6.1 E-9	7.1 E-10	3.9 E-10	8.4 E-9	2.9 E-8	1.6 E-8	1.8 E-9	9.9 E-10
4,4'-DDT	4.3 E-9	1.5 E-8	8.0 E-9	9.2 E-10	5.0 E-10	8.2 E-9	2.9 E-8	1.5 E-8	1.8 E-9	9.7 E-10
Aroclor-1254	3.2 E-4	1.1 E-3	6.0 E-4	7.0 E-5	3.8 E-5	9.9 E-6	3.4 E-5	1.8 E-5	2.1 E-6	1.2 E-6
Hexachlorobenzene	7.6 E-6	2.6 E-5	1.4 E-5	1.6 E-6	8.9 E-7	7.6 E-6	2.6 E-5	1.4 E-5	1.6 E-6	8.9 E-7
Hexachlorobutadiene	1.3 E-9	4.7 E-9	2.5 E-9	2.9 E-10	1.6 E-10	1.3 E-9	4.7 E-9	2.5 E-9	2.9 E-10	1.6 E-10
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total HEPTA CDD	6.7 E-11	2.3 E-10	1.3 E-10	1.5 E-11	7.9 E-12	2.2 E-12	7.8 E-12	4.2 E-12	4.8 E-13	2.6 E-13
Total OCTA CDD	6.3 E-11	2.2 E-10	1.2 E-10	1.4 E-11	7.4 E-12	4.1 E-13	1.4 E-12	7.7 E-13	8.9 E-14	4.8 E-14
2,3,7,8-TCDD	nd	nd	nd	nd	nd	2.6 E-12	9.1 E-12	4.9 E-12	5.7 E-13	3.1 E-13
Total TETRA CDF	nd	nd	nd	nd	nd	2.6 E-12	9.1 E-12	4.9 E-12	5.7 E-13	3.1 E-13

nd = not detected or not calculated

TABLE 3-21

ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Copper	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Methylene Chloride	3.2 E-7	3.1 E-7	8.3 E-7	3.1 E-7	8.3 E-7	2.7 E-6	2.7 E-6	7.0 E-6	2.7 E-6	7.0 E-6
Acetone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Butanone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	2.4 E-8	2.3 E-8	6.1 E-8	2.3 E-8	6.1 E-8	2.4 E-8	2.3 E-8	6.1 E-8	2.3 E-8	6.1 E-8
Tetrachloroethene	9.1 E-8	8.9 E-8	2.3 E-7	8.9 E-8	2.3 E-7	4.2 E-6	4.1 E-6	1.1 E-5	4.1 E-6	1.1 E-5
Toluene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Methylphenol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diethylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	5.3 E-6	5.2 E-6	1.4 E-5	5.2 E-6	1.4 E-5	2.9 E-6	2.9 E-6	7.6 E-6	2.9 E-6	7.6 E-6
Chrysene	4.8 E-6	4.7 E-6	1.2 E-5	4.7 E-6	1.2 E-5	3.0 E-6	3.0 E-6	7.8 E-6	3.0 E-6	7.8 E-6
bis(2-Ethylhexyl)Phthalate	6.6 E-6	6.5 E-6	1.7 E-5	6.5 E-6	1.7 E-5	4.0 E-6	3.9 E-6	1.0 E-5	3.9 E-6	1.0 E-5

TABLE 3-21
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH SITE-WIDE SOILS
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	7.2 E-6	7.1 E-6	1.9 E-5	7.1 E-6	1.9 E-5	3.8 E-6	3.8 E-6	9.9 E-6	3.8 E-6	9.9 E-6
Benzo(k)Fluoranthene	2.4 E-6	2.4 E-6	6.2 E-6	2.4 E-6	6.2 E-6	2.0 E-6	1.9 E-6	5.0 E-6	1.9 E-6	5.0 E-6
Benzo(a)Pyrene	4.0 E-6	4.0 E-6	1.0 E-5	4.0 E-6	1.0 E-5	2.8 E-6	2.7 E-6	7.1 E-6	2.7 E-6	7.1 E-6
Indeno(1,2,3-cd)Pyrene	2.2 E-6	2.1 E-6	5.6 E-6	2.1 E-6	5.6 E-6	1.9 E-6	1.8 E-6	4.8 E-6	1.8 E-6	4.8 E-6
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	nd	nd	nd	nd	nd	9.9 E-8	9.7 E-8	2.5 E-7	9.7 E-8	2.5 E-7
Endrin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDD	4.3 E-8	4.2 E-8	1.1 E-7	4.2 E-8	1.1 E-7	1.1 E-7	1.1 E-7	2.8 E-7	1.1 E-7	2.8 E-7
4,4'-DDT	5.6 E-8	5.5 E-8	1.4 E-7	5.5 E-8	1.4 E-7	1.1 E-7	1.1 E-7	2.8 E-7	1.1 E-7	2.8 E-7
Aroclor-1254	4.2 E-3	4.1 E-3	1.1 E-2	4.1 E-3	1.1 E-2	1.3 E-4	1.3 E-4	3.3 E-4	1.3 E-4	3.3 E-4
Hexachlorobenzene	9.9 E-5	9.7 E-5	2.6 E-4	9.7 E-5	2.6 E-4	9.9 E-5	9.7 E-5	2.6 E-4	9.7 E-5	2.6 E-4
Hexachlorobutadiene	1.8 E-8	1.7 E-8	4.6 E-8	1.7 E-8	4.6 E-8	1.8 E-8	1.7 E-8	4.6 E-8	1.7 E-8	4.6 E-8
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total HEPTA CDD	8.9 E-10	8.7 E-10	2.3 E-9	8.7 E-10	2.3 E-9	3.0 E-11	2.9 E-11	7.6 E-11	2.9 E-11	7.6 E-11
Total OCTA CDD	8.3 E-10	8.1 E-10	2.1 E-9	8.1 E-10	2.1 E-9	5.4 E-12	5.3 E-12	1.4 E-11	5.3 E-12	1.4 E-11
2,3,7,8-TCDD	nd	nd	nd	nd	nd	3.5 E-11	3.4 E-11	8.9 E-11	3.4 E-11	8.9 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	3.5 E-11	3.4 E-11	8.9 E-11	3.4 E-11	8.9 E-11

nd = not detected or not calculated

TABLE 3-22
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM SITE-WIDE SOILS
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Antimony	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cadmium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chromium	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Copper	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Lead	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Silver	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Zinc	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cyanide	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Methylene Chloride	3.3 E-7	3.5 E-7	8.4 E-7	3.2 E-7	8.3 E-7	2.8 E-6	2.9 E-6	7.1 E-6	2.7 E-6	7.0 E-6
Acetone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Butanone	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	2.5 E-8	2.6 E-8	6.3 E-8	2.3 E-8	6.1 E-8	2.5 E-8	2.6 E-8	6.3 E-8	2.3 E-8	6.1 E-8
Tetrachloroethene	9.4 E-8	9.9 E-8	2.4 E-7	9.0 E-8	2.3 E-7	4.3 E-6	4.5 E-6	1.1 E-5	4.1 E-6	1.1 E-5
Toluene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene (total)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Methylphenol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diethylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Di-n-Butylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Butylbenzylphthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)Anthracene	5.7 E-6	6.6 E-6	1.4 E-5	5.3 E-6	1.4 E-5	3.2 E-6	3.7 E-6	8.0 E-6	2.9 E-6	7.6 E-6
Chrysene	5.2 E-6	6.0 E-6	1.3 E-5	4.8 E-6	1.2 E-5	3.3 E-6	3.8 E-6	8.2 E-6	3.0 E-6	7.8 E-6
bis(2-Ethylhexyl)Phthalate	7.1 E-6	8.2 E-6	1.8 E-5	6.6 E-6	1.7 E-5	4.3 E-6	5.0 E-6	1.1 E-5	4.0 E-6	1.0 E-5

TABLE 3-22

ESTIMATED TOTAL CARCINOGENIC INTAKE FROM SITE-WIDE SOILS

(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Di-n-Octyl Phthalate	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)Fluoranthene	7.8 E-6	9.0 E-6	2.0 E-5	7.2 E-6	1.9 E-5	4.1 E-6	4.8 E-6	1.0 E-5	3.8 E-6	9.9 E-6
Benzo(k)Fluoranthene	2.6 E-6	3.0 E-6	6.6 E-6	2.4 E-6	6.3 E-6	2.1 E-6	2.4 E-6	5.3 E-6	1.9 E-6	5.1 E-6
Benzo(a)Pyrene	4.3 E-6	5.0 E-6	1.1 E-5	4.0 E-6	1.0 E-5	3.0 E-6	3.4 E-6	7.5 E-6	2.7 E-6	7.1 E-6
Indeno(1,2,3-cd)Pyrene	2.4 E-6	2.7 E-6	6.0 E-6	2.2 E-6	5.7 E-6	2.0 E-6	2.3 E-6	5.1 E-6	1.9 E-6	4.8 E-6
Benzo(g,h,i)Perylene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE	nd	nd	nd	nd	nd	1.1 E-7	1.2 E-7	2.7 E-7	9.8 E-8	2.5 E-7
Endrin	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDD	4.7 E-8	5.4 E-8	1.2 E-7	4.3 E-8	1.1 E-7	1.2 E-7	1.4 E-7	3.0 E-7	1.1 E-7	2.9 E-7
4,4'-DDT	6.0 E-8	7.0 E-8	1.5 E-7	5.6 E-8	1.5 E-7	1.2 E-7	1.3 E-7	2.9 E-7	1.1 E-7	2.8 E-7
Aroclor-1254	4.6 E-3	5.3 E-3	1.2 E-2	4.2 E-3	1.1 E-2	1.4 E-4	1.6 E-4	3.5 E-4	1.3 E-4	3.4 E-4
Hexachlorobenzene	1.1 E-4	1.2 E-4	2.7 E-4	9.9 E-5	2.6 E-4	1.1 E-4	1.2 E-4	2.7 E-4	9.9 E-5	2.6 E-4
Hexachlorobutadiene	1.9 E-8	2.2 E-8	4.8 E-8	1.8 E-8	4.6 E-8	1.9 E-8	2.2 E-8	4.8 E-8	1.8 E-8	4.6 E-8
Heptachloronorborene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Total HEPTA CDD	9.5 E-10	1.1 E-9	2.4 E-9	8.8 E-10	2.3 E-9	3.2 E-11	3.7 E-11	8.0 E-11	2.9 E-11	7.6 E-11
Total OCTA CDD	8.9 E-10	1.0 E-9	2.3 E-9	8.3 E-10	2.1 E-9	5.8 E-12	6.7 E-12	1.5 E-11	5.4 E-12	1.4 E-11
2,3,7,8-TCDD	nd	nd	nd	nd	nd	3.7 E-11	4.3 E-11	9.4 E-11	3.4 E-11	8.9 E-11
Total TETRA CDF	nd	nd	nd	nd	nd	3.7 E-11	4.3 E-11	9.4 E-11	3.4 E-11	8.9 E-11

nd = not detected or not calculated

TABLE 3-23
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	9.1 E-4	6.1 E-3	2.6 E-3	ne	ne	5.4 E-1	3.7 E+0	1.6 E+0	ne	ne
Arsenic	nd	nd	nd	ne	ne	6.0 E-4	4.1 E-3	1.7 E-3	ne	ne
Barium	1.2 E-3	7.9 E-3	3.4 E-3	ne	ne	5.8 E-2	3.9 E-1	1.7 E-1	ne	ne
Cadmium	2.1 E-5	1.4 E-4	6.1 E-5	ne	ne	6.3 E-4	4.2 E-3	1.8 E-3	ne	ne
Chromium	nd	nd	nd	ne	ne	1.3 E-3	9.1 E-3	3.9 E-3	ne	ne
Cobalt	nd	nd	nd	ne	ne	3.0 E-3	2.1 E-2	8.9 E-3	ne	ne
Copper	3.7 E-4	2.5 E-3	1.1 E-3	ne	ne	1.6 E-3	1.1 E-2	4.7 E-3	ne	ne
Lead	6.7 E-5	4.6 E-4	2.0 E-4	ne	ne	5.3 E-3	3.6 E-2	1.5 E-2	ne	ne
Manganese	6.6 E-3	4.4 E-2	1.9 E-2	ne	ne	1.8 E-1	1.2 E+0	5.1 E-1	ne	ne
Nickel	nd	nd	nd	ne	ne	4.0 E-3	2.7 E-2	1.2 E-2	ne	ne
Vanadium	nd	nd	nd	ne	ne	1.3 E-3	8.9 E-3	3.9 E-3	ne	ne
Zinc	1.3 E-2	8.8 E-2	3.8 E-2	ne	ne	1.3 E-2	8.8 E-2	3.8 E-2	ne	ne
Cyanide	nd	nd	nd	ne	ne	2.3 E-4	1.6 E-3	6.7 E-4	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	4.7 E-4	3.2 E-3	1.4 E-3	ne	ne
Chloroethane	nd	nd	nd	ne	ne	5.1 E-4	3.4 E-3	1.5 E-3	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	1.4 E-4	9.3 E-4	4.0 E-4	ne	ne
Acetone	nd	nd	nd	ne	ne	5.8 E-2	3.9 E-1	1.7 E-1	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	8.0 E-4	5.4 E-3	2.3 E-3	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	4.4 E-2	3.0 E-1	1.3 E-1	ne	ne
Chloroform	7.8 E-5	5.3 E-4	2.3 E-4	ne	ne	8.3 E-4	5.6 E-3	2.4 E-3	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	1.8 E-3	1.2 E-2	5.1 E-3	ne	ne
2-Butanone	nd	nd	nd	ne	ne	3.5 E-4	2.4 E-3	1.0 E-3	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	1.2 E-4	7.9 E-4	3.4 E-4	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	6.6 E-5	4.4 E-4	1.9 E-4	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	3.6 E-3	2.5 E-2	1.1 E-2	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	6.9 E-4	4.7 E-3	2.0 E-3	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	5.4 E-4	3.6 E-3	1.6 E-3	ne	ne
Benzene	nd	nd	nd	ne	ne	2.0 E-1	1.3 E+0	5.7 E-1	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	2.0 E-4	1.3 E-3	5.7 E-4	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	5.9 E-5	4.0 E-4	1.7 E-4	ne	ne
Toluene	nd	nd	nd	ne	ne	3.0 E-2	2.1 E-1	8.9 E-2	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	2.6 E-4	1.8 E-3	7.7 E-4	ne	ne

TABLE 3-23
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	nd	nd	nd	ne	ne	7.8 E-4	5.3 E-3	2.3 E-3	ne	ne
Xylene (total)	nd	nd	nd	ne	ne	1.8 E-3	1.2 E-2	5.1 E-3	ne	ne
Phenol	nd	nd	nd	ne	ne	6.6 E-3	4.4 E-2	1.9 E-2	ne	ne
bis(2-Chloroethyl)Ether	nd	nd	nd	ne	ne	2.3 E-3	1.6 E-2	6.9 E-3	ne	ne
1,4-Dichlorobenzene	nd	nd	nd	ne	ne	1.1 E-4	7.3 E-4	3.1 E-4	ne	ne
Benzyl Alcohol	nd	nd	nd	ne	ne	9.8 E-6	6.6 E-5	2.9 E-5	ne	ne
1,2-Dichlorobenzene	nd	nd	nd	ne	ne	5.9 E-5	4.0 E-4	1.7 E-4	ne	ne
2-Methylphenol	nd	nd	nd	ne	ne	4.4 E-3	3.0 E-2	1.3 E-2	ne	ne
4-Methylphenol	nd	nd	nd	ne	ne	3.4 E-3	2.3 E-2	1.0 E-2	ne	ne
Naphthalene	7.1 E-6	4.8 E-5	2.1 E-5	ne	ne	6.3 E-4	4.2 E-3	1.8 E-3	ne	ne
2-Methylnaphthalene	nd	nd	nd	ne	ne	2.9 E-5	2.0 E-4	8.6 E-5	ne	ne
Pentachlorophenol	nd	nd	nd	ne	ne	2.5 E-3	1.7 E-2	7.4 E-3	ne	ne
Di-n-Butylphthalate	nd	nd	nd	ne	ne	2.9 E-5	2.0 E-4	8.6 E-5	ne	ne
bis(2-Ethylhexyl)Phthalate	nd	nd	nd	ne	ne	1.2 E-4	7.9 E-4	3.4 E-4	ne	ne
Aldrin	nd	nd	nd	ne	ne	4.9 E-6	3.3 E-5	1.4 E-5	ne	ne
Dieldrin	nd	nd	nd	ne	ne	1.3 E-6	8.6 E-6	3.7 E-6	ne	ne
4,4'-DDT	8.8 E-7	6.0 E-6	2.6 E-6	ne	ne	8.8 E-7	6.0 E-6	2.6 E-6	ne	ne
Aroclor-1254	2.0 E-6	1.3 E-5	5.7 E-6	ne	ne	2.0 E-6	1.3 E-5	5.7 E-6	ne	ne
Hexachlorobenzene	nd	nd	nd	ne	ne	2.3 E-6	1.6 E-5	6.9 E-6	ne	ne
Hexachlorobutadiene	nd	nd	nd	ne	ne	8.5 E-7	5.8 E-6	2.5 E-6	ne	ne
Heptachloronorborene	nd	nd	nd	ne	ne	1.1 E-6	7.3 E-6	3.1 E-6	ne	ne

nd = not detected or not calculated   ne = no exposure

TABLE 3-24
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	nd	1.3 E-5	7.7 E-6	ne	ne	nd	8.0 E-3	4.6 E-3	ne	ne
Arsenic	nd	nd	nd	ne	ne	nd	8.9 E-6	5.1 E-6	ne	ne
Barium	nd	1.7 E-5	1.0 E-5	ne	ne	nd	8.6 E-4	4.9 E-4	ne	ne
Cadmium	nd	3.1 E-7	1.8 E-7	ne	ne	nd	9.3 E-6	5.3 E-6	ne	ne
Chromium	nd	nd	nd	ne	ne	nd	2.8 E-5	1.6 E-5	ne	ne
Cobalt	nd	nd	nd	ne	ne	nd	4.5 E-5	2.6 E-5	ne	ne
Copper	nd	5.5 E-6	3.1 E-6	ne	ne	nd	2.4 E-5	1.4 E-5	ne	ne
Lead	nd	1.0 E-6	5.7 E-7	ne	ne	nd	7.8 E-5	4.5 E-5	ne	ne
Manganese	nd	9.7 E-5	5.6 E-5	ne	ne	nd	2.6 E-3	1.5 E-3	ne	ne
Nickel	nd	nd	nd	ne	ne	nd	5.9 E-5	3.4 E-5	ne	ne
Vanadium	nd	nd	nd	ne	ne	nd	2.0 E-5	1.1 E-5	ne	ne
Zinc	nd	1.9 E-4	1.1 E-4	ne	ne	nd	1.9 E-4	1.1 E-4	ne	ne
Cyanide	nd	nd	nd	ne	ne	nd	3.4 E-6	2.0 E-6	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	nd	4.7 E-3	2.7 E-3	ne	ne
Chloroethane	nd	nd	nd	ne	ne	nd	5.1 E-3	2.9 E-3	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	nd	1.4 E-3	7.8 E-4	ne	ne
Acetone	nd	nd	nd	ne	ne	nd	5.7 E-1	3.3 E-1	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	nd	8.0 E-3	4.6 E-3	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	nd	4.4 E-1	2.5 E-1	ne	ne
Chloroform	nd	7.8 E-4	4.5 E-4	ne	ne	nd	8.3 E-3	4.8 E-3	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	nd	1.8 E-2	1.0 E-2	ne	ne
2-Butanone	nd	nd	nd	ne	ne	nd	1.7 E-5	1.0 E-5	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	nd	1.2 E-3	6.7 E-4	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	nd	6.5 E-4	3.8 E-4	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	nd	3.6 E-2	2.1 E-2	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	nd	6.9 E-3	4.0 E-3	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	nd	5.4 E-3	3.1 E-3	ne	ne
Benzene	nd	nd	nd	ne	ne	nd	2.1 E-1	1.2 E-1	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	nd	1.9 E-3	1.1 E-3	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	nd	5.8 E-4	3.4 E-4	ne	ne
Toluene	nd	nd	nd	ne	ne	nd	3.0 E-1	1.7 E-1	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	nd	2.6 E-3	1.5 E-3	ne	ne

TABLE 3-24
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	ne	nd	nd	ne	ne	ne	7.7 E-4	4.4 E-4	ne	ne
Xylene (total)	ne	nd	nd	ne	ne	ne	1.7 E-3	1.0 E-3	ne	ne
Phenol	ne	nd	nd	ne	ne	ne	9.7 E-5	5.6 E-5	ne	ne
bis(2-Chloroethyl)Ether	ne	nd	nd	ne	ne	ne	3.5 E-5	2.0 E-5	ne	ne
1,4-Dichlorobenzene	ne	nd	nd	ne	ne	ne	1.6 E-6	9.1 E-7	ne	ne
Benzyl Alcohol	ne	nd	nd	ne	ne	ne	1.4 E-7	8.3 E-8	ne	ne
1,2-Dichlorobenzene	ne	nd	nd	ne	ne	ne	8.7 E-7	5.0 E-7	ne	ne
2-Methylphenol	ne	nd	nd	ne	ne	ne	6.5 E-5	3.7 E-5	ne	ne
4-Methylphenol	ne	nd	nd	ne	ne	ne	5.1 E-5	2.9 E-5	ne	ne
Naphthalene	ne	1.1 E-7	6.1 E-8	ne	ne	ne	9.3 E-6	5.3 E-6	ne	ne
2-Methylnaphthalene	ne	nd	nd	ne	ne	ne	4.3 E-7	2.5 E-7	ne	ne
Pentachlorophenol	ne	nd	nd	ne	ne	ne	3.8 E-5	2.2 E-5	ne	ne
Di-n-Butylphthalate	ne	nd	nd	ne	ne	ne	4.3 E-7	2.5 E-7	ne	ne
bis(2-Ethylhexyl)Phthalate	ne	nd	nd	ne	ne	ne	1.7 E-6	1.0 E-6	ne	ne
Aldrin	ne	nd	nd	ne	ne	ne	7.2 E-8	4.2 E-8	ne	ne
Dieldrin	ne	nd	nd	ne	ne	ne	1.9 E-8	1.1 E-8	ne	ne
4,4'-DDT	ne	1.3 E-8	7.5 E-9	ne	ne	ne	1.3 E-8	7.5 E-9	ne	ne
Aroclor-1254	ne	2.9 E-8	1.7 E-8	ne	ne	ne	2.9 E-8	1.7 E-8	ne	ne
Hexachlorobenzene	ne	nd	nd	ne	ne	ne	3.7 E-9	2.1 E-9	ne	ne
Hexachlorobutadiene	ne	nd	nd	ne	ne	ne	1.3 E-8	7.2 E-9	ne	ne
Heptachloronorborene	ne	nd	nd	ne	ne	ne	1.6 E-8	9.1 E-9	ne	ne

nd = not detected or not calculated   ne = no exposure

TABLE 3-25
ESTIMATED NON-CARCINOGENIC INTAKE FROM INHALATION OF GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Arsenic	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Barium	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Cadmium	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Chromium	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Cobalt	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Copper	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Lead	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Manganese	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Nickel	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Vanadium	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Zinc	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Cyanide	nd	nd	nd	ne	ne	nd	nd	nd	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	nd	2.1 E-3	4.6 E-4	ne	ne
Chloroethane	nd	nd	nd	ne	ne	nd	1.2 E-3	2.5 E-4	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	nd	1.3 E-4	2.9 E-5	ne	ne
Acetone	nd	nd	nd	ne	ne	nd	3.2 E-2	6.8 E-3	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	nd	4.3 E-4	9.2 E-5	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	nd	9.2 E-3	2.0 E-3	ne	ne
Chloroform	nd	3.6 E-5	7.8 E-6	ne	ne	nd	3.8 E-4	8.3 E-5	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	nd	3.1 E-4	6.6 E-5	ne	ne
2-Butanone	nd	nd	nd	ne	ne	nd	8.6 E-5	1.8 E-5	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	nd	3.6 E-5	7.8 E-6	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	nd	1.8 E-5	4.0 E-6	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	nd	4.9 E-4	1.1 E-4	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	nd	1.3 E-4	2.9 E-5	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	nd	3.9 E-5	8.3 E-6	ne	ne
Benzene	nd	nd	nd	ne	ne	nd	4.8 E-2	1.0 E-2	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	nd	1.1 E-5	2.4 E-6	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	nd	1.8 E-5	3.9 E-6	ne	ne
Toluene	nd	nd	nd	ne	ne	nd	2.5 E-3	5.4 E-4	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	nd	1.0 E-5	2.2 E-6	ne	ne

TABLE 3-25
ESTIMATED NON-CARCINOGENIC INTAKE FROM INHALATION OF GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	ne	nd	nd	ne	ne	ne	2.4 E-5	5.3 E-6	ne	ne
Xylene (total)	ne	nd	nd	ne	ne	ne	5.1 E-5	1.1 E-5	ne	ne
Phenol	ne	nd	nd	ne	ne	ne	1.4 E-5	3.0 E-6	ne	ne
bis(2-Chloroethyl)Ether	ne	nd	nd	ne	ne	ne	6.6 E-6	1.4 E-6	ne	ne
1,4-Dichlorobenzene	ne	nd	nd	ne	ne	ne	7.6 E-7	1.6 E-7	ne	ne
Benzyl Alcohol	ne	nd	nd	ne	ne	ne	7.8 E-9	1.7 E-9	ne	ne
1,2-Dichlorobenzene	ne	nd	nd	ne	ne	ne	3.3 E-7	7.1 E-8	ne	ne
2-Methylphenol	ne	nd	nd	ne	ne	ne	6.6 E-6	1.4 E-6	ne	ne
4-Methylphenol	ne	nd	nd	ne	ne	ne	2.3 E-6	5.1 E-7	ne	ne
Naphthalene	ne	8.3 E-9	1.8 E-9	ne	ne	ne	7.3 E-7	1.6 E-7	ne	ne
2-Methylnaphthalene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Pentachlorophenol	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Di-n-Butylphthalate	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
bis(2-Ethylhexyl)Phthalate	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Aldrin	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Dieldrin	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
4,4'-DDT	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Aroclor-1254	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Hexachlorobenzene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Hexachlorobutadiene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Heptachloronorborene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne

nd = not detected or not calculated ne = no exposure

TABLE 3-25a
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	9.1 E-4	6.1 E-3	2.7 E-3	ne	ne	5.4 E-1	3.7 E+0	1.6 E+0	ne	ne
Arsenic	nd	nd	nd	ne	ne	6.0 E-4	4.1 E-3	1.8 E-3	ne	ne
Barium	1.2 E-3	8.0 E-3	3.4 E-3	ne	ne	5.8 E-2	3.9 E-1	1.7 E-1	ne	ne
Cadmium	2.1 E-5	1.4 E-4	6.1 E-5	ne	ne	6.3 E-4	4.2 E-3	1.8 E-3	ne	ne
Chromium	nd	nd	nd	ne	ne	1.3 E-3	9.1 E-3	3.9 E-3	ne	ne
Cobalt	nd	nd	nd	ne	ne	3.0 E-3	2.1 E-2	8.9 E-3	ne	ne
Copper	3.7 E-4	2.5 E-3	1.1 E-3	ne	ne	1.6 E-3	1.1 E-2	4.7 E-3	ne	ne
Lead	6.7 E-5	4.6 E-4	2.0 E-4	ne	ne	5.3 E-3	3.6 E-2	1.5 E-2	ne	ne
Manganese	6.6 E-3	4.5 E-2	1.9 E-2	ne	ne	1.8 E-1	1.2 E+0	5.2 E-1	ne	ne
Nickel	nd	nd	nd	ne	ne	4.0 E-3	2.7 E-2	1.2 E-2	ne	ne
Vanadium	nd	nd	nd	ne	ne	1.3 E-3	9.0 E-3	3.9 E-3	ne	ne
Zinc	1.3 E-2	8.8 E-2	3.8 E-2	ne	ne	1.3 E-2	8.8 E-2	3.8 E-2	ne	ne
Cyanide	nd	nd	nd	ne	ne	2.3 E-4	1.6 E-3	6.7 E-4	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	4.7 E-4	7.9 E-3	4.1 E-3	ne	ne
Chloroethane	nd	nd	nd	ne	ne	5.1 E-4	8.5 E-3	4.4 E-3	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	1.4 E-4	2.3 E-3	1.2 E-3	ne	ne
Acetone	nd	nd	nd	ne	ne	5.8 E-2	9.7 E-1	5.0 E-1	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	8.0 E-4	1.3 E-2	6.9 E-3	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	4.4 E-2	7.4 E-1	3.8 E-1	ne	ne
Chloroform	7.8 E-5	1.3 E-3	6.8 E-4	ne	ne	8.3 E-4	1.4 E-2	7.2 E-3	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	1.8 E-3	2.9 E-2	1.5 E-2	ne	ne
2-Butanone	nd	nd	nd	ne	ne	3.5 E-4	2.4 E-3	1.0 E-3	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	1.2 E-4	2.0 E-3	1.0 E-3	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	6.6 E-5	1.1 E-3	5.7 E-4	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	3.6 E-3	6.1 E-2	3.1 E-2	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	6.9 E-4	1.2 E-2	6.0 E-3	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	5.4 E-4	9.0 E-3	4.7 E-3	ne	ne
Benzene	nd	nd	nd	ne	ne	2.0 E-1	1.5 E+0	6.9 E-1	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	2.0 E-4	3.3 E-3	1.7 E-3	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	5.9 E-5	9.8 E-4	5.1 E-4	ne	ne
Toluene	nd	nd	nd	ne	ne	3.0 E-2	5.1 E-1	2.6 E-1	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	2.6 E-4	4.4 E-3	2.3 E-3	ne	ne

TABLE 3-25a
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	nd	nd	nd	ne	ne	7.8 E-4	6.1 E-3	2.7 E-3	ne	ne
Xylene (total)	nd	nd	nd	ne	ne	1.8 E-3	1.4 E-2	6.1 E-3	ne	ne
Phenol	nd	nd	nd	ne	ne	6.6 E-3	4.4 E-2	1.9 E-2	ne	ne
bis(2-Chloroethyl)Ether	nd	nd	nd	ne	ne	2.3 E-3	1.6 E-2	6.9 E-3	ne	ne
1,4-Dichlorobenzene	nd	nd	nd	ne	ne	1.1 E-4	7.3 E-4	3.2 E-4	ne	ne
Benzyl Alcohol	nd	nd	nd	ne	ne	9.8 E-6	6.6 E-5	2.9 E-5	ne	ne
1,2-Dichlorobenzene	nd	nd	nd	ne	ne	5.9 E-5	4.0 E-4	1.7 E-4	ne	ne
2-Methylphenol	nd	nd	nd	ne	ne	4.4 E-3	3.0 E-2	1.3 E-2	ne	ne
4-Methylphenol	nd	nd	nd	ne	ne	3.4 E-3	2.3 E-2	1.0 E-2	ne	ne
Naphthalene	7.1 E-6	4.8 E-5	2.1 E-5	ne	ne	6.3 E-4	4.2 E-3	1.8 E-3	ne	ne
2-Methylnaphthalene	nd	nd	nd	ne	ne	2.9 E-5	2.0 E-4	8.6 E-5	ne	ne
Pentachlorophenol	nd	nd	nd	ne	ne	2.5 E-3	1.7 E-2	7.5 E-3	ne	ne
Di-n-Butylphthalate	nd	nd	nd	ne	ne	2.9 E-5	2.0 E-4	8.6 E-5	ne	ne
bis(2-Ethylhexyl)Phthalate	nd	nd	nd	ne	ne	1.2 E-4	8.0 E-4	3.4 E-4	ne	ne
Aldrin	nd	nd	nd	ne	ne	4.9 E-6	3.3 E-5	1.4 E-5	ne	ne
Dieldrin	nd	nd	nd	ne	ne	1.3 E-6	8.6 E-6	3.7 E-6	ne	ne
4,4'-DDT	8.8 E-7	6.0 E-6	2.6 E-6	ne	ne	8.8 E-7	6.0 E-6	2.6 E-6	ne	ne
Aroclor-1254	2.0 E-6	1.3 E-5	5.7 E-6	ne	ne	2.0 E-6	1.3 E-5	5.7 E-6	ne	ne
Hexachlorobenzene	nd	nd	nd	ne	ne	2.3 E-6	1.6 E-5	6.9 E-6	ne	ne
Hexachlorobutadiene	nd	nd	nd	ne	ne	8.5 E-7	5.8 E-6	2.5 E-6	ne	ne
Heptachloronorborene	nd	nd	nd	ne	ne	1.1 E-6	7.3 E-6	3.2 E-6	ne	ne

nd = not detected or not calculated ne = no exposure

TABLE 3-26
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	nd	5.3 E-4	1.1 E-3	ne	ne	nd	3.2 E-1	6.8 E-1	ne	ne
Arsenic	nd	nd	nd	ne	ne	nd	3.5 E-4	7.5 E-4	ne	ne
Barium	nd	6.8 E-4	1.5 E-3	ne	ne	nd	3.4 E-2	7.3 E-2	ne	ne
Cadmium	nd	1.2 E-5	2.6 E-5	ne	ne	nd	3.6 E-4	7.8 E-4	ne	ne
Chromium	nd	nd	nd	ne	ne	nd	7.8 E-4	1.7 E-3	ne	ne
Cobalt	nd	nd	nd	ne	ne	nd	1.8 E-3	3.8 E-3	ne	ne
Copper	nd	2.1 E-4	4.6 E-4	ne	ne	nd	9.3 E-4	2.0 E-3	ne	ne
Lead	nd	3.9 E-5	8.4 E-5	ne	ne	nd	3.1 E-3	6.6 E-3	ne	ne
Manganese	nd	3.8 E-3	8.2 E-3	ne	ne	nd	1.0 E-1	2.2 E-1	ne	ne
Nickel	nd	nd	nd	ne	ne	nd	2.3 E-3	5.0 E-3	ne	ne
Vanadium	nd	nd	nd	ne	ne	nd	7.7 E-4	1.7 E-3	ne	ne
Zinc	nd	7.5 E-3	1.6 E-2	ne	ne	nd	7.5 E-3	1.6 E-2	ne	ne
Cyanide	nd	nd	nd	ne	ne	nd	1.3 E-4	2.9 E-4	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	nd	2.7 E-4	5.9 E-4	ne	ne
Chloroethane	nd	nd	nd	ne	ne	nd	3.0 E-4	6.4 E-4	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	nd	7.9 E-5	1.7 E-4	ne	ne
Acetone	nd	nd	nd	ne	ne	nd	3.3 E-2	7.2 E-2	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	nd	4.7 E-4	1.0 E-3	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	nd	2.6 E-2	5.5 E-2	ne	ne
Chloroform	nd	4.5 E-5	9.8 E-5	ne	ne	nd	4.8 E-4	1.0 E-3	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	nd	1.0 E-3	2.2 E-3	ne	ne
2-Butanone	nd	nd	nd	ne	ne	nd	2.0 E-4	4.4 E-4	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	nd	6.8 E-5	1.5 E-4	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	nd	3.8 E-5	8.2 E-5	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	nd	2.1 E-3	4.5 E-3	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	nd	4.0 E-4	8.7 E-4	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	nd	3.1 E-4	6.7 E-4	ne	ne
Benzene	nd	nd	nd	ne	ne	nd	1.1 E-1	2.4 E-1	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	nd	1.1 E-4	2.4 E-4	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	nd	3.4 E-5	7.3 E-5	ne	ne
Toluene	nd	nd	nd	ne	ne	nd	1.8 E-2	3.8 E-2	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	nd	1.5 E-4	3.3 E-4	ne	ne

TABLE 3-26
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	nd	nd	nd	ne	ne	nd	4.5 E-4	9.8 E-4	ne	ne
Xylene (total)	nd	nd	nd	ne	ne	nd	1.0 E-3	2.2 E-3	ne	ne
Phenol	nd	nd	nd	ne	ne	nd	3.8 E-3	8.2 E-3	ne	ne
bis(2-Chloroethyl)Ether	nd	nd	nd	ne	ne	nd	1.4 E-3	2.9 E-3	ne	ne
1,4-Dichlorobenzene	nd	nd	nd	ne	ne	nd	6.2 E-5	1.3 E-4	ne	ne
Benzyl Alcohol	nd	nd	nd	ne	ne	nd	5.7 E-6	1.2 E-5	ne	ne
1,2-Dichlorobenzene	nd	nd	nd	ne	ne	nd	3.4 E-5	7.3 E-5	ne	ne
2-Methylphenol	nd	nd	nd	ne	ne	nd	2.6 E-3	5.5 E-3	ne	ne
4-Methylphenol	nd	nd	nd	ne	ne	nd	2.0 E-3	4.3 E-3	ne	ne
Naphthalene	nd	4.1 E-6	8.9 E-6	ne	ne	nd	3.6 E-4	7.8 E-4	ne	ne
2-Methylnaphthalene	nd	nd	nd	ne	ne	nd	1.7 E-5	3.7 E-5	ne	ne
Pentachlorophenol	nd	nd	nd	ne	ne	nd	1.5 E-3	3.2 E-3	ne	ne
Di-n-Butylphthalate	nd	nd	nd	ne	ne	nd	1.7 E-5	3.7 E-5	ne	ne
bis(2-Ethylhexyl)Phthalate	nd	nd	nd	ne	ne	nd	6.8 E-5	1.5 E-4	ne	ne
Aldrin	nd	nd	nd	ne	ne	nd	2.8 E-6	6.1 E-6	ne	ne
Dieldrin	nd	nd	nd	ne	ne	nd	7.4 E-7	1.6 E-6	ne	ne
4,4'-DDT	nd	5.1 E-7	1.1 E-6	ne	ne	nd	5.1 E-7	1.1 E-6	ne	ne
Aroclor-1254	nd	1.1 E-6	2.4 E-6	ne	ne	nd	1.1 E-6	2.4 E-6	ne	ne
Hexachlorobenzene	nd	nd	nd	ne	ne	nd	1.4 E-6	2.9 E-6	ne	ne
Hexachlorobutadiene	nd	nd	nd	ne	ne	nd	4.9 E-7	1.1 E-6	ne	ne
Heptachloronorborene	nd	nd	nd	ne	ne	nd	6.2 E-7	1.3 E-6	ne	ne

nd = not detected or not calculated

ne = no exposure

TABLE 3-27
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	1.1 E-6	3.3 E-6	ne	ne	ne	6.9 E-4	2.0 E-3	ne	ne
Arsenic	ne	nd	nd	ne	ne	ne	7.6 E-7	2.2 E-6	ne	ne
Barium	ne	1.5 E-6	4.3 E-6	ne	ne	ne	7.4 E-5	2.1 E-4	ne	ne
Cadmium	ne	2.7 E-8	7.6 E-8	ne	ne	ne	7.9 E-7	2.3 E-6	ne	ne
Chromium	ne	nd	nd	ne	ne	ne	2.4 E-6	6.8 E-6	ne	ne
Cobalt	ne	nd	nd	ne	ne	ne	3.8 E-6	1.1 E-5	ne	ne
Copper	ne	4.7 E-7	1.3 E-6	ne	ne	ne	2.0 E-6	5.8 E-6	ne	ne
Lead	ne	8.5 E-8	2.5 E-7	ne	ne	ne	6.7 E-6	1.9 E-5	ne	ne
Manganese	ne	8.3 E-6	2.4 E-5	ne	ne	ne	2.2 E-4	6.4 E-4	ne	ne
Nickel	ne	nd	nd	ne	ne	ne	5.1 E-6	1.5 E-5	ne	ne
Vanadium	ne	nd	nd	ne	ne	ne	1.7 E-6	4.8 E-6	ne	ne
Zinc	ne	1.6 E-5	4.7 E-5	ne	ne	ne	1.6 E-5	4.7 E-5	ne	ne
Cyanide	ne	nd	nd	ne	ne	ne	2.9 E-7	8.4 E-7	ne	ne
Vinyl Chloride	ne	nd	nd	ne	ne	ne	4.0 E-4	1.2 E-3	ne	ne
Chloroethane	ne	nd	nd	ne	ne	ne	4.3 E-4	1.2 E-3	ne	ne
Methylene Chloride	ne	nd	nd	ne	ne	ne	1.2 E-4	3.4 E-4	ne	ne
Acetone	ne	nd	nd	ne	ne	ne	4.9 E-2	1.4 E-1	ne	ne
1,1-Dichloroethane	ne	nd	nd	ne	ne	ne	6.8 E-4	2.0 E-3	ne	ne
1,2-Dichloroethene	ne	nd	nd	ne	ne	ne	3.8 E-2	1.1 E-1	ne	ne
Chloroform	ne	6.7 E-5	1.9 E-4	ne	ne	ne	7.1 E-4	2.0 E-3	ne	ne
1,2-Dichloroethane	ne	nd	nd	ne	ne	ne	1.5 E-3	4.3 E-3	ne	ne
2-Butanone	ne	nd	nd	ne	ne	ne	1.5 E-6	4.3 E-6	ne	ne
1,1,1-Trichloroethane	ne	nd	nd	ne	ne	ne	1.0 E-4	2.9 E-4	ne	ne
Carbon Tetrachloride	ne	nd	nd	ne	ne	ne	5.6 E-5	1.6 E-4	ne	ne
1,2-Dichloropropane	ne	nd	nd	ne	ne	ne	3.1 E-3	8.9 E-3	ne	ne
Trichloroethene	ne	nd	nd	ne	ne	ne	5.9 E-4	1.7 E-3	ne	ne
1,1,2-Trichloroethane	ne	nd	nd	ne	ne	ne	4.6 E-4	1.3 E-3	ne	ne
Benzene	ne	nd	nd	ne	ne	ne	1.8 E-2	5.3 E-2	ne	ne
Tetrachloroethene	ne	nd	nd	ne	ne	ne	1.7 E-4	4.8 E-4	ne	ne
1,1,2,2-Tetrachloroethane	ne	nd	nd	ne	ne	ne	5.0 E-5	1.4 E-4	ne	ne
Toluene	ne	nd	nd	ne	ne	ne	2.6 E-2	7.4 E-2	ne	ne
Chlorobenzene	ne	nd	nd	ne	ne	ne	2.3 E-4	6.5 E-4	ne	ne

TABLE 3-27
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	ne	nd	nd	ne	ne	ne	6.6 E-5	1.9 E-4	ne	ne
Xylene (total)	ne	nd	nd	ne	ne	ne	1.5 E-4	4.3 E-4	ne	ne
Phenol	ne	nd	nd	ne	ne	ne	8.3 E-6	2.4 E-5	ne	ne
bis(2-Chloroethyl)Ether	ne	nd	nd	ne	ne	ne	3.0 E-6	8.6 E-6	ne	ne
1,4-Dichlorobenzene	ne	nd	nd	ne	ne	ne	1.4 E-7	3.9 E-7	ne	ne
Benzyl Alcohol	ne	nd	nd	ne	ne	ne	1.2 E-8	3.6 E-8	ne	ne
1,2-Dichlorobenzene	ne	nd	nd	ne	ne	ne	7.4 E-8	2.1 E-7	ne	ne
2-Methylphenol	ne	nd	nd	ne	ne	ne	5.6 E-6	1.6 E-5	ne	ne
4-Methylphenol	ne	nd	nd	ne	ne	ne	4.3 E-6	1.2 E-5	ne	ne
Naphthalene	ne	9.1 E-9	2.6 E-8	ne	ne	ne	7.9 E-7	2.3 E-6	ne	ne
2-Methylnaphthalene	ne	nd	nd	ne	ne	ne	3.7 E-8	1.1 E-7	ne	ne
Pentachlorophenol	ne	nd	nd	ne	ne	ne	3.2 E-6	9.3 E-6	ne	ne
Di-n-Butylphthalate	ne	nd	nd	ne	ne	ne	3.7 E-8	1.1 E-7	ne	ne
bis(2-Ethylhexyl)Phthalate	ne	nd	nd	ne	ne	ne	1.5 E-7	4.3 E-7	ne	ne
Aldrin	ne	nd	nd	ne	ne	ne	6.2 E-9	1.8 E-8	ne	ne
Dieldrin	ne	nd	nd	ne	ne	ne	1.6 E-9	4.6 E-9	ne	ne
4,4'-DDT	ne	1.1 E-9	3.2 E-9	ne	ne	ne	1.1 E-9	3.2 E-9	ne	ne
Aroclor-1254	ne	2.5 E-9	7.1 E-9	ne	ne	ne	2.5 E-9	7.1 E-9	ne	ne
Hexachlorobenzene	ne	nd	nd	ne	ne	ne	3.2 E-10	9.1 E-10	ne	ne
Hexachlorobutadiene	ne	nd	nd	ne	ne	ne	1.1 E-9	3.1 E-9	ne	ne
Heptachloronorborene	ne	nd	nd	ne	ne	ne	1.4 E-9	3.9 E-9	ne	ne

nd = not detected or not calculated

ne = no exposure

TABLE 3-28
ESTIMATED CARCINOGENIC INTAKE FROM INHALATION OF GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Arsenic	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Barium	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Cadmium	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Chromium	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Cobalt	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Copper	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Lead	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Manganese	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Nickel	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Vanadium	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Zinc	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Cyanide	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Vinyl Chloride	ne	nd	nd	ne	ne	ne	1.8 E-4	2.0 E-4	ne	ne
Chloroethane	ne	nd	nd	ne	ne	ne	1.0 E-4	1.1 E-4	ne	ne
Methylene Chloride	ne	nd	nd	ne	ne	ne	1.1 E-5	1.2 E-5	ne	ne
Acetone	ne	nd	nd	ne	ne	ne	2.7 E-3	2.9 E-3	ne	ne
1,1-Dichloroethane	ne	nd	nd	ne	ne	ne	3.7 E-5	4.0 E-5	ne	ne
1,2-Dichloroethene	ne	nd	nd	ne	ne	ne	7.9 E-4	8.5 E-4	ne	ne
Chloroform	ne	3.1 E-6	3.3 E-6	ne	ne	ne	3.3 E-5	3.5 E-5	ne	ne
1,2-Dichloroethane	ne	nd	nd	ne	ne	ne	2.6 E-5	2.8 E-5	ne	ne
2-Butanone	ne	nd	nd	ne	ne	ne	7.3 E-6	7.9 E-6	ne	ne
1,1,1-Trichloroethane	ne	nd	nd	ne	ne	ne	3.1 E-6	3.3 E-6	ne	ne
Carbon Tetrachloride	ne	nd	nd	ne	ne	ne	1.6 E-6	1.7 E-6	ne	ne
1,2-Dichloropropane	ne	nd	nd	ne	ne	ne	4.2 E-5	4.5 E-5	ne	ne
Trichloroethene	ne	nd	nd	ne	ne	ne	1.1 E-5	1.2 E-5	ne	ne
1,1,2-Trichloroethane	ne	nd	nd	ne	ne	ne	3.3 E-6	3.6 E-6	ne	ne
Benzene	ne	nd	nd	ne	ne	ne	4.1 E-3	4.4 E-3	ne	ne
Tetrachloroethene	ne	nd	nd	ne	ne	ne	9.3 E-7	1.0 E-6	ne	ne
1,1,2,2-Tetrachloroethane	ne	nd	nd	ne	ne	ne	1.6 E-6	1.7 E-6	ne	ne
Toluene	ne	nd	nd	ne	ne	ne	2.1 E-4	2.3 E-4	ne	ne
Chlorobenzene	ne	nd	nd	ne	ne	ne	8.6 E-7	9.2 E-7	ne	ne

TABLE 3-28
ESTIMATED CARCINOGENIC INTAKE FROM INHALATION OF GROUND WATER VIA SHOWERING
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	ne	nd	nd	ne	ne	ne	2.1 E-6	2.3 E-6	ne	ne
Xylene (total)	ne	nd	nd	ne	ne	ne	4.4 E-6	4.7 E-6	ne	ne
Phenol	ne	nd	nd	ne	ne	ne	1.2 E-6	1.3 E-6	ne	ne
bis(2-Chloroethyl)Ether	ne	nd	nd	ne	ne	ne	5.7 E-7	6.1 E-7	ne	ne
1,4-Dichlorobenzene	ne	nd	nd	ne	ne	ne	6.5 E-8	7.0 E-8	ne	ne
Benzyl Alcohol	ne	nd	nd	ne	ne	ne	6.7 E-10	7.2 E-10	ne	ne
1,2-Dichlorobenzene	ne	nd	nd	ne	ne	ne	2.8 E-8	3.0 E-8	ne	ne
2-Methylphenol	ne	nd	nd	ne	ne	ne	5.7 E-7	6.1 E-7	ne	ne
4-Methylphenol	ne	nd	nd	ne	ne	ne	2.0 E-7	2.2 E-7	ne	ne
Naphthalene	ne	7.1 E-10	7.7 E-10	ne	ne	ne	6.3 E-8	6.8 E-8	ne	ne
2-Methylnaphthalene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Pentachlorophenol	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Di-n-Butylphthalate	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
bis(2-Ethylhexyl)Phthalate	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Aldrin	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Dieldrin	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
4,4'-DDT	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Aroclor-1254	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Hexachlorobenzene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Hexachlorobutadiene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne
Heptachloronorborene	ne	nd	nd	ne	ne	ne	nd	nd	ne	ne

nd = not detected or not calculated   ne = no exposure

TABLE 3-28a
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	nd	5.3 E-4	1.1 E-3	ne	ne	nd	3.2 E-1	6.8 E-1	ne	ne
Arsenic	nd	nd	nd	ne	ne	nd	3.5 E-4	7.5 E-4	ne	ne
Barium	nd	6.8 E-4	1.5 E-3	ne	ne	nd	3.4 E-2	7.3 E-2	ne	ne
Cadmium	nd	1.2 E-5	2.6 E-5	ne	ne	nd	3.6 E-4	7.9 E-4	ne	ne
Chromium	nd	nd	nd	ne	ne	nd	7.8 E-4	1.7 E-3	ne	ne
Cobalt	nd	nd	nd	ne	ne	nd	1.8 E-3	3.8 E-3	ne	ne
Copper	nd	2.1 E-4	4.6 E-4	ne	ne	nd	9.3 E-4	2.0 E-3	ne	ne
Lead	nd	3.9 E-5	8.4 E-5	ne	ne	nd	3.1 E-3	6.6 E-3	ne	ne
Manganese	nd	3.8 E-3	8.2 E-3	ne	ne	nd	1.0 E-1	2.2 E-1	ne	ne
Nickel	nd	nd	nd	ne	ne	nd	2.3 E-3	5.0 E-3	ne	ne
Vanadium	nd	nd	nd	ne	ne	nd	7.7 E-4	1.7 E-3	ne	ne
Zinc	nd	7.6 E-3	1.6 E-2	ne	ne	nd	7.6 E-3	1.6 E-2	ne	ne
Cyanide	nd	nd	nd	ne	ne	nd	1.3 E-4	2.9 E-4	ne	ne
Vinyl Chloride	nd	nd	nd	ne	ne	nd	6.7 E-4	1.7 E-3	ne	ne
Chloroethane	nd	nd	nd	ne	ne	nd	7.3 E-4	1.9 E-3	ne	ne
Methylene Chloride	nd	nd	nd	ne	ne	nd	2.0 E-4	5.1 E-4	ne	ne
Acetone	nd	nd	nd	ne	ne	nd	8.3 E-2	2.1 E-1	ne	ne
1,1-Dichloroethane	nd	nd	nd	ne	ne	nd	1.1 E-3	3.0 E-3	ne	ne
1,2-Dichloroethene	nd	nd	nd	ne	ne	nd	6.3 E-2	1.6 E-1	ne	ne
Chloroform	nd	1.1 E-4	2.9 E-4	ne	ne	nd	1.2 E-3	3.1 E-3	ne	ne
1,2-Dichloroethane	nd	nd	nd	ne	ne	nd	2.5 E-3	6.5 E-3	ne	ne
2-Butanone	nd	nd	nd	ne	ne	nd	2.1 E-4	4.5 E-4	ne	ne
1,1,1-Trichloroethane	nd	nd	nd	ne	ne	nd	1.7 E-4	4.3 E-4	ne	ne
Carbon Tetrachloride	nd	nd	nd	ne	ne	nd	9.4 E-5	2.4 E-4	ne	ne
1,2-Dichloropropane	nd	nd	nd	ne	ne	nd	5.2 E-3	1.3 E-2	ne	ne
Trichloroethene	nd	nd	nd	ne	ne	nd	1.0 E-3	2.6 E-3	ne	ne
1,1,2-Trichloroethane	nd	nd	nd	ne	ne	nd	7.7 E-4	2.0 E-3	ne	ne
Benzene	nd	nd	nd	ne	ne	nd	1.3 E-1	3.0 E-1	ne	ne
Tetrachloroethene	nd	nd	nd	ne	ne	nd	2.8 E-4	7.2 E-4	ne	ne
1,1,2,2-Tetrachloroethane	nd	nd	nd	ne	ne	nd	8.4 E-5	2.2 E-4	ne	ne
Toluene	nd	nd	nd	ne	ne	nd	4.3 E-2	1.1 E-1	ne	ne
Chlorobenzene	nd	nd	nd	ne	ne	nd	3.8 E-4	9.8 E-4	ne	ne

TABLE 3-28a
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM GROUND WATER
(mg/kg/day)

Chemical	Current					Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Ethylbenzene	nd	nd	nd	ne	ne	nd	5.2 E-4	1.2 E-3	ne	ne
Xylene (total)	nd	nd	nd	ne	ne	nd	1.2 E-3	2.6 E-3	ne	ne
Phenol	nd	nd	nd	ne	ne	nd	3.8 E-3	8.2 E-3	ne	ne
bis(2-Chloroethyl)Ether	nd	nd	nd	ne	ne	nd	1.4 E-3	2.9 E-3	ne	ne
1,4-Dichlorobenzene	nd	nd	nd	ne	ne	nd	6.3 E-5	1.4 E-4	ne	ne
Benzyl Alcohol	nd	nd	nd	ne	ne	nd	5.7 E-6	1.2 E-5	ne	ne
1,2-Dichlorobenzene	nd	nd	nd	ne	ne	nd	3.4 E-5	7.4 E-5	ne	ne
2-Methylphenol	nd	nd	nd	ne	ne	nd	2.6 E-3	5.5 E-3	ne	ne
4-Methylphenol	nd	nd	nd	ne	ne	nd	2.0 E-3	4.3 E-3	ne	ne
Naphthalene	nd	4.2 E-6	9.0 E-6	ne	ne	nd	3.6 E-4	7.9 E-4	ne	ne
2-Methylnaphthalene	nd	nd	nd	ne	ne	nd	1.7 E-5	3.7 E-5	ne	ne
Pentachlorophenol	nd	nd	nd	ne	ne	nd	1.5 E-3	3.2 E-3	ne	ne
Di-n-Butylphthalate	nd	nd	nd	ne	ne	nd	1.7 E-5	3.7 E-5	ne	ne
bis(2-Ethylhexyl)Phthalate	nd	nd	nd	ne	ne	nd	6.8 E-5	1.5 E-4	ne	ne
Aldrin	nd	nd	nd	ne	ne	nd	2.8 E-6	6.1 E-6	ne	ne
Dieldrin	nd	nd	nd	ne	ne	nd	7.4 E-7	1.6 E-6	ne	ne
4,4'-DDT	nd	5.1 E-7	1.1 E-6	ne	ne	nd	5.1 E-7	1.1 E-6	ne	ne
Aroclor-1254	nd	1.1 E-6	2.5 E-6	ne	ne	nd	1.1 E-6	2.5 E-6	ne	ne
Hexachlorobenzene	nd	nd	nd	ne	ne	nd	1.4 E-6	2.9 E-6	ne	ne
Hexachlorobutadiene	nd	nd	nd	ne	ne	nd	4.9 E-7	1.1 E-6	ne	ne
Heptachloronorborene	nd	nd	nd	ne	ne	nd	6.3 E-7	1.4 E-6	ne	ne

nd = not detected or not calculated ne = no exposure

TABLE 3-29
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	8.2 E-8	1.8 E-8	8.2 E-8	1.8 E-8
Arsenic	ne	nd	nd	nd	nd	ne	1.1 E-7	2.3 E-8	1.1 E-7	2.3 E-8
Barium	ne	1.0 E-5	2.2 E-6	1.0 E-5	2.2 E-6	ne	9.2 E-5	2.0 E-5	9.2 E-5	2.0 E-5
Cadmium	ne	nd	nd	nd	nd	ne	1.4 E-7	3.0 E-8	1.4 E-7	3.0 E-8
Chromium	ne	nd	nd	nd	nd	ne	6.2 E-9	1.3 E-9	6.2 E-9	1.3 E-9
Cobalt	ne	9.2 E-7	2.0 E-7	9.2 E-7	2.0 E-7	ne	7.7 E-9	1.7 E-9	7.7 E-9	1.7 E-9
Copper	ne	nd	nd	nd	nd	ne	2.8 E-7	6.0 E-8	2.8 E-7	6.0 E-8
Lead	ne	nd	nd	nd	nd	ne	1.2 E-6	2.6 E-7	1.2 E-6	2.6 E-7
Manganese	ne	nd	nd	nd	nd	ne	1.4 E-6	3.1 E-7	1.4 E-6	3.1 E-7
Nickel	ne	1.3 E-6	2.8 E-7	1.3 E-6	2.8 E-7	ne	1.8 E-6	3.8 E-7	1.8 E-6	3.8 E-7
Vanadium	ne	8.2 E-7	1.8 E-7	8.2 E-7	1.8 E-7	ne	2.2 E-6	4.8 E-7	2.2 E-6	4.8 E-7
Zinc	ne	nd	nd	nd	nd	ne	8.8 E-6	1.9 E-6	8.8 E-6	1.9 E-6
Cyanide	ne	nd	nd	nd	nd	ne	2.0 E-8	4.3 E-9	2.0 E-8	4.3 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	3.3 E-8	7.2 E-9	3.3 E-8	7.2 E-9
Chloroethane	ne	nd	nd	nd	nd	ne	8.4 E-8	1.8 E-8	8.4 E-8	1.8 E-8
Methylene Chloride	ne	nd	nd	nd	nd	ne	8.4 E-9	1.8 E-9	8.4 E-9	1.8 E-9
Acetone	ne	nd	nd	nd	nd	ne	4.9 E-8	1.0 E-8	4.9 E-8	1.0 E-8
Carbon Disulfide	ne	5.0 E-8	1.1 E-8	5.0 E-8	1.1 E-8	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	1.4 E-7	3.0 E-8	1.4 E-7	3.0 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	6.0 E-8	1.3 E-8	6.0 E-8	1.3 E-8
Chloroform	ne	nd	nd	nd	nd	ne	3.6 E-5	7.8 E-6	3.6 E-5	7.8 E-6
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	1.8 E-7	3.9 E-8	1.8 E-7	3.9 E-8
2-Butanone	ne	nd	nd	nd	nd	ne	2.5 E-8	5.5 E-9	2.5 E-8	5.5 E-9
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	2.0 E-5	4.3 E-6	2.0 E-5	4.3 E-6
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	1.7 E-5	3.8 E-6	1.7 E-5	3.8 E-6
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	3.2 E-4	6.9 E-5	3.2 E-4	6.9 E-5
Trichloroethene	ne	nd	nd	nd	nd	ne	5.3 E-5	1.1 E-5	5.3 E-5	1.1 E-5
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	3.2 E-4	6.8 E-5	3.2 E-4	6.8 E-5
Benzene	ne	nd	nd	nd	nd	ne	3.5 E-5	7.5 E-6	3.5 E-5	7.5 E-6
Tetrachloroethene	ne	nd	nd	nd	nd	ne	5.8 E-6	1.3 E-6	5.8 E-6	1.3 E-6
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	5.3 E-5	1.1 E-5	5.3 E-5	1.1 E-5
Toluene	ne	nd	nd	nd	nd	ne	5.9 E-3	1.3 E-3	5.9 E-3	1.3 E-3

TABLE 3-29
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	2.2 E-6	4.7 E-7	2.2 E-6	4.7 E-7
Ethylbenzene	ne	nd	nd	nd	nd	ne	4.3 E-6	9.2 E-7	4.3 E-6	9.2 E-7
Xylene (total)	ne	5.0 E-7	1.1 E-7	5.0 E-7	1.1 E-7	ne	3.6 E-5	7.7 E-6	3.6 E-5	7.7 E-6
Phenol	ne	1.3 E-6	2.8 E-7	1.3 E-6	2.8 E-7	ne	9.1 E-5	2.0 E-5	9.1 E-5	2.0 E-5
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	1.0 E-5	2.2 E-6	1.0 E-5	2.2 E-6
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	5.4 E-7	1.2 E-7	5.4 E-7	1.2 E-7
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	3.9 E-5	8.4 E-6	3.9 E-5	8.4 E-6
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	3.5 E-7	7.5 E-8	3.5 E-7	7.5 E-8
2-Methylphenol	ne	nd	nd	nd	nd	ne	5.7 E-6	1.2 E-6	5.7 E-6	1.2 E-6
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	8.4 E-6	1.8 E-6	8.4 E-6	1.8 E-6
Naphthalene	ne	nd	nd	nd	nd	ne	4.8 E-6	1.0 E-6	4.8 E-6	1.0 E-6
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	7.7 E-7	1.7 E-7	7.7 E-7	1.7 E-7
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	6.6 E-7	1.4 E-7	6.6 E-7	1.4 E-7	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	3.1 E-7	6.6 E-8	3.1 E-7	6.6 E-8
Di-n-Butylphthalate	ne	1.7 E-6	3.6 E-7	1.7 E-6	3.6 E-7	ne	6.1 E-8	1.3 E-8	6.1 E-8	1.3 E-8
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.9 E-6	4.1 E-7	1.9 E-6	4.1 E-7	ne	9.4 E-8	2.0 E-8	9.4 E-8	2.0 E-8
Di-n-Octyl Phthalate	ne	7.1 E-7	1.5 E-7	7.1 E-7	1.5 E-7	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	2.0 E-7	4.3 E-8	2.0 E-7	4.3 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	9.1 E-8	2.0 E-8	9.1 E-8	2.0 E-8
4,4'-DDT	ne	nd	nd	nd	nd	ne	2.6 E-9	5.7 E-10	2.6 E-9	5.7 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.1 E-9	4.5 E-10	2.1 E-9	4.5 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	2.2 E-5	4.8 E-6	2.2 E-5	4.8 E-6
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	4.3 E-7	9.3 E-8	4.3 E-7	9.3 E-8
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.3 E-6	4.9 E-7	2.3 E-6	4.9 E-7

nd = not detected or not calculated   ne = no exposure

TABLE 3-29
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	1.1 E-5	2.4 E-6	1.1 E-5	2.4 E-6
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-29
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	5.0 E-7	1.1 E-7	5.0 E-7	1.1 E-7
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	5.0 E-7	1.1 E-7	5.0 E-7	1.1 E-7
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	5.0 E-7	1.1 E-7	5.0 E-7	1.1 E-7
bis(2-Ethylhexyl)Phthalate	ne	7.8 E-6	1.7 E-6	7.8 E-6	1.7 E-6
Di-n-Octyl Phthalate	ne	5.9 E-7	1.3 E-7	5.9 E-7	1.3 E-7
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated

ne = no exposure

TABLE 3-30
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.8 E-8	1.0 E-8	1.8 E-8	1.0 E-8
Arsenic	ne	nd	nd	nd	nd	ne	2.3 E-8	1.3 E-8	2.3 E-8	1.3 E-8
Barium	ne	2.3 E-6	1.3 E-6	2.3 E-6	1.3 E-6	ne	2.0 E-5	1.2 E-5	2.0 E-5	1.2 E-5
Cadmium	ne	nd	nd	nd	nd	ne	3.0 E-8	1.7 E-8	3.0 E-8	1.7 E-8
Chromium	ne	nd	nd	nd	nd	ne	1.9 E-9	1.1 E-9	1.9 E-9	1.1 E-9
Cobalt	ne	2.0 E-7	1.2 E-7	2.0 E-7	1.2 E-7	ne	1.7 E-9	9.7 E-10	1.7 E-9	9.7 E-10
Copper	ne	nd	nd	nd	nd	ne	6.0 E-8	3.5 E-8	6.0 E-8	3.5 E-8
Lead	ne	nd	nd	nd	nd	ne	2.7 E-7	1.5 E-7	2.7 E-7	1.5 E-7
Manganese	ne	nd	nd	nd	nd	ne	3.1 E-7	1.8 E-7	3.1 E-7	1.8 E-7
Nickel	ne	2.8 E-7	1.6 E-7	2.8 E-7	1.6 E-7	ne	3.8 E-7	2.2 E-7	3.8 E-7	2.2 E-7
Vanadium	ne	1.8 E-7	1.0 E-7	1.8 E-7	1.0 E-7	ne	4.8 E-7	2.8 E-7	4.8 E-7	2.8 E-7
Zinc	ne	nd	nd	nd	nd	ne	1.9 E-6	1.1 E-6	1.9 E-6	1.1 E-6
Cyanide	ne	nd	nd	nd	nd	ne	4.3 E-9	2.5 E-9	4.3 E-9	2.5 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	4.9 E-6	2.8 E-6	4.9 E-6	2.8 E-6
Chloroethane	ne	nd	nd	nd	nd	ne	1.2 E-5	7.1 E-6	1.2 E-5	7.1 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	1.2 E-6	7.1 E-7	1.2 E-6	7.1 E-7
Acetone	ne	nd	nd	nd	nd	ne	7.1 E-6	4.1 E-6	7.1 E-6	4.1 E-6
Carbon Disulfide	ne	7.3 E-6	4.2 E-6	7.3 E-6	4.2 E-6	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	2.1 E-5	1.2 E-5	2.1 E-5	1.2 E-5
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	8.8 E-6	5.1 E-6	8.8 E-6	5.1 E-6
Chloroform	ne	nd	nd	nd	nd	ne	5.3 E-3	3.0 E-3	5.3 E-3	3.0 E-3
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	2.7 E-5	1.5 E-5	2.7 E-5	1.5 E-5
2-Butanone	ne	nd	nd	nd	nd	ne	1.8 E-8	1.1 E-8	1.8 E-8	1.1 E-8
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	2.9 E-3	1.7 E-3	2.9 E-3	1.7 E-3
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	2.6 E-3	1.5 E-3	2.6 E-3	1.5 E-3
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	4.7 E-2	2.7 E-2	4.7 E-2	2.7 E-2
Trichloroethene	ne	nd	nd	nd	nd	ne	7.8 E-3	4.5 E-3	7.8 E-3	4.5 E-3
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	4.7 E-2	2.7 E-2	4.7 E-2	2.7 E-2
Benzene	ne	nd	nd	nd	nd	ne	5.6 E-4	3.2 E-4	5.6 E-4	3.2 E-4
Tetrachloroethene	ne	nd	nd	nd	nd	ne	8.5 E-4	4.9 E-4	8.5 E-4	4.9 E-4
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	7.8 E-3	4.5 E-3	7.8 E-3	4.5 E-3
Toluene	ne	nd	nd	nd	nd	ne	8.7 E-1	5.0 E-1	8.7 E-1	5.0 E-1

TABLE 3-30
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	3.2 E-4	1.8 E-4	3.2 E-4	1.8 E-4
Ethylbenzene	ne	nd	nd	nd	nd	ne	6.2 E-5	3.6 E-5	6.2 E-5	3.6 E-5
Xylene (total)	ne	7.2 E-6	4.1 E-6	7.2 E-6	4.1 E-6	ne	5.2 E-4	3.0 E-4	5.2 E-4	3.0 E-4
Phenol	ne	2.8 E-7	1.6 E-7	2.8 E-7	1.6 E-7	ne	2.0 E-5	1.1 E-5	2.0 E-5	1.1 E-5
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	2.2 E-6	1.3 E-6	2.2 E-6	1.3 E-6
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	1.2 E-7	6.7 E-8	1.2 E-7	6.7 E-8
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	8.5 E-6	4.9 E-6	8.5 E-6	4.9 E-6
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	7.6 E-8	4.4 E-8	7.6 E-8	4.4 E-8
2-Methylphenol	ne	nd	nd	nd	nd	ne	1.2 E-6	7.1 E-7	1.2 E-6	7.1 E-7
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	1.8 E-6	1.1 E-6	1.8 E-6	1.1 E-6
Naphthalene	ne	nd	nd	nd	nd	ne	1.0 E-6	6.0 E-7	1.0 E-6	6.0 E-7
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	1.7 E-7	9.6 E-8	1.7 E-7	9.6 E-8
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	1.4 E-7	8.3 E-8	1.4 E-7	8.3 E-8	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	6.7 E-8	3.8 E-8	6.7 E-8	3.8 E-8
Di-n-Butylphthalate	ne	3.6 E-7	2.1 E-7	3.6 E-7	2.1 E-7	ne	1.3 E-8	7.7 E-9	1.3 E-8	7.7 E-9
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	4.1 E-7	2.4 E-7	4.1 E-7	2.4 E-7	ne	2.1 E-8	1.2 E-8	2.1 E-8	1.2 E-8
Di-n-Octyl Phthalate	ne	1.6 E-7	8.9 E-8	1.6 E-7	8.9 E-8	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	4.4 E-8	2.5 E-8	4.4 E-8	2.5 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	2.0 E-8	1.1 E-8	2.0 E-8	1.1 E-8
4,4'-DDT	ne	nd	nd	nd	nd	ne	5.8 E-10	3.3 E-10	5.8 E-10	3.3 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	4.5 E-10	2.6 E-10	4.5 E-10	2.6 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	5.2 E-7	3.0 E-7	5.2 E-7	3.0 E-7
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	9.4 E-8	5.4 E-8	9.4 E-8	5.4 E-8
Heptachloronorborene	ne	nd	nd	nd	nd	ne	4.9 E-7	2.8 E-7	4.9 E-7	2.8 E-7

nd = not detected or not calculated   ne = no exposure

TABLE 3-30
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	2.5 E-6	1.4 E-6	2.5 E-6	1.4 E-6
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-30
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	1.1 E-7	6.2 E-8	1.1 E-7	6.2 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	1.1 E-7	6.2 E-8	1.1 E-7	6.2 E-8
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	1.1 E-7	6.2 E-8	1.1 E-7	6.2 E-8
bis(2-Ethylhexyl)Phthalate	ne	1.7 E-6	9.7 E-7	1.7 E-6	9.7 E-7
Di-n-Octyl Phthalate	ne	1.3 E-7	7.5 E-8	1.3 E-7	7.5 E-8
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated

ne = no exposure

TABLE 3-31
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.0 E-7	2.8 E-8	1.0 E-7	2.8 E-8
Arsenic	ne	nd	nd	nd	nd	ne	1.3 E-7	3.6 E-8	1.3 E-7	3.6 E-8
Barium	ne	1.3 E-5	3.5 E-6	1.3 E-5	3.5 E-6	ne	1.1 E-4	3.2 E-5	1.1 E-4	3.2 E-5
Cadmium	ne	nd	nd	nd	nd	ne	1.7 E-7	4.7 E-8	1.7 E-7	4.7 E-8
Chromium	ne	nd	nd	nd	nd	ne	8.1 E-9	2.4 E-9	8.1 E-9	2.4 E-9
Cobalt	ne	1.1 E-6	3.2 E-7	1.1 E-6	3.2 E-7	ne	9.4 E-9	2.6 E-9	9.4 E-9	2.6 E-9
Copper	ne	nd	nd	nd	nd	ne	3.4 E-7	9.4 E-8	3.4 E-7	9.4 E-8
Lead	ne	nd	nd	nd	nd	ne	1.5 E-6	4.2 E-7	1.5 E-6	4.2 E-7
Manganese	ne	nd	nd	nd	nd	ne	1.7 E-6	4.9 E-7	1.7 E-6	4.9 E-7
Nickel	ne	1.6 E-6	4.4 E-7	1.6 E-6	4.4 E-7	ne	2.1 E-6	6.0 E-7	2.1 E-6	6.0 E-7
Vanadium	ne	1.0 E-6	2.8 E-7	1.0 E-6	2.8 E-7	ne	2.7 E-6	7.6 E-7	2.7 E-6	7.6 E-7
Zinc	ne	nd	nd	nd	nd	ne	1.1 E-5	3.0 E-6	1.1 E-5	3.0 E-6
Cyanide	ne	nd	nd	nd	nd	ne	2.4 E-8	6.8 E-9	2.4 E-8	6.8 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	4.9 E-6	2.8 E-6	4.9 E-6	2.8 E-6
Chloroethane	ne	nd	nd	nd	nd	ne	1.3 E-5	7.2 E-6	1.3 E-5	7.2 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	1.2 E-6	7.2 E-7	1.2 E-6	7.2 E-7
Acetone	ne	nd	nd	nd	nd	ne	7.2 E-6	4.1 E-6	7.2 E-6	4.1 E-6
Carbon Disulfide	ne	7.3 E-6	4.2 E-6	7.3 E-6	4.2 E-6	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	2.1 E-5	1.2 E-5	2.1 E-5	1.2 E-5
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	8.9 E-6	5.1 E-6	8.9 E-6	5.1 E-6
Chloroform	ne	nd	nd	nd	nd	ne	5.3 E-3	3.0 E-3	5.3 E-3	3.0 E-3
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	2.7 E-5	1.5 E-5	2.7 E-5	1.5 E-5
2-Butanone	ne	nd	nd	nd	nd	ne	4.4 E-8	1.6 E-8	4.4 E-8	1.6 E-8
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	2.9 E-3	1.7 E-3	2.9 E-3	1.7 E-3
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	2.6 E-3	1.5 E-3	2.6 E-3	1.5 E-3
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	4.7 E-2	2.7 E-2	4.7 E-2	2.7 E-2
Trichloroethene	ne	nd	nd	nd	nd	ne	7.9 E-3	4.5 E-3	7.9 E-3	4.5 E-3
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	4.7 E-2	2.7 E-2	4.7 E-2	2.7 E-2
Benzene	ne	nd	nd	nd	nd	ne	6.0 E-4	3.3 E-4	6.0 E-4	3.3 E-4
Tetrachloroethene	ne	nd	nd	nd	nd	ne	8.6 E-4	4.9 E-4	8.6 E-4	4.9 E-4
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	7.8 E-3	4.5 E-3	7.8 E-3	4.5 E-3
Toluene	ne	nd	nd	nd	nd	ne	8.8 E-1	5.0 E-1	8.8 E-1	5.0 E-1

TABLE 3-31
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	3.2 E-4	1.8 E-4	3.2 E-4	1.8 E-4
Ethylbenzene	ne	nd	nd	nd	nd	ne	6.7 E-5	3.7 E-5	6.7 E-5	3.7 E-5
Xylene (total)	ne	7.7 E-6	4.3 E-6	7.7 E-6	4.3 E-6	ne	5.6 E-4	3.1 E-4	5.6 E-4	3.1 E-4
Phenol	ne	1.6 E-6	4.4 E-7	1.6 E-6	4.4 E-7	ne	1.1 E-4	3.1 E-5	1.1 E-4	3.1 E-5
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	1.2 E-5	3.5 E-6	1.2 E-5	3.5 E-6
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	6.5 E-7	1.8 E-7	6.5 E-7	1.8 E-7
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	4.7 E-5	1.3 E-5	4.7 E-5	1.3 E-5
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	4.2 E-7	1.2 E-7	4.2 E-7	1.2 E-7
2-Methylphenol	ne	nd	nd	nd	nd	ne	6.9 E-6	1.9 E-6	6.9 E-6	1.9 E-6
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	1.0 E-5	2.9 E-6	1.0 E-5	2.9 E-6
Naphthalene	ne	nd	nd	nd	nd	ne	5.8 E-6	1.6 E-6	5.8 E-6	1.6 E-6
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	9.3 E-7	2.6 E-7	9.3 E-7	2.6 E-7
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	8.0 E-7	2.3 E-7	8.0 E-7	2.3 E-7	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	3.7 E-7	1.0 E-7	3.7 E-7	1.0 E-7
Di-n-Butylphthalate	ne	2.0 E-6	5.6 E-7	2.0 E-6	5.6 E-7	ne	7.4 E-8	2.1 E-8	7.4 E-8	2.1 E-8
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	2.3 E-6	6.5 E-7	2.3 E-6	6.5 E-7	ne	1.1 E-7	3.2 E-8	1.1 E-7	3.2 E-8
Di-n-Octyl Phthalate	ne	8.7 E-7	2.4 E-7	8.7 E-7	2.4 E-7	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	2.4 E-7	6.8 E-8	2.4 E-7	6.8 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	1.1 E-7	3.1 E-8	1.1 E-7	3.1 E-8
4,4'-DDT	ne	nd	nd	nd	nd	ne	3.2 E-9	9.0 E-10	3.2 E-9	9.0 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.5 E-9	7.1 E-10	2.5 E-9	7.1 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	2.3 E-5	5.1 E-6	2.3 E-5	5.1 E-6
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	5.2 E-7	1.5 E-7	5.2 E-7	1.5 E-7
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.8 E-6	7.7 E-7	2.8 E-6	7.7 E-7

nd = not detected or not calculated ne = no exposure

TABLE 3-31
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	1.4 E-5	3.9 E-6	1.4 E-5	3.9 E-6
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-31
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	6.0 E-7	1.7 E-7	6.0 E-7	1.7 E-7
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	6.0 E-7	1.7 E-7	6.0 E-7	1.7 E-7
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	6.0 E-7	1.7 E-7	6.0 E-7	1.7 E-7
bis(2-Ethylhexyl)Phthalate	ne	9.5 E-6	2.6 E-6	9.5 E-6	2.6 E-6
Di-n-Octyl Phthalate	ne	7.2 E-7	2.0 E-7	7.2 E-7	2.0 E-7
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-32
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	7.1 E-9	7.6 E-9	7.1 E-9	7.6 E-9
Arsenic	ne	nd	nd	nd	nd	ne	9.0 E-9	9.7 E-9	9.0 E-9	9.7 E-9
Barium	ne	8.9 E-7	9.6 E-7	8.9 E-7	9.6 E-7	ne	7.9 E-6	8.6 E-6	7.9 E-6	8.6 E-6
Cadmium	ne	nd	nd	nd	nd	ne	1.2 E-8	1.3 E-8	1.2 E-8	1.3 E-8
Chromium	ne	nd	nd	nd	nd	ne	5.3 E-10	5.7 E-10	5.3 E-10	5.7 E-10
Cobalt	ne	7.9 E-8	8.5 E-8	7.9 E-8	8.5 E-8	ne	6.6 E-10	7.2 E-10	6.6 E-10	7.2 E-10
Copper	ne	nd	nd	nd	nd	ne	2.4 E-8	2.6 E-8	2.4 E-8	2.6 E-8
Lead	ne	nd	nd	nd	nd	ne	1.0 E-7	1.1 E-7	1.0 E-7	1.1 E-7
Manganese	ne	nd	nd	nd	nd	ne	1.2 E-7	1.3 E-7	1.2 E-7	1.3 E-7
Nickel	ne	1.1 E-7	1.2 E-7	1.1 E-7	1.2 E-7	ne	1.5 E-7	1.6 E-7	1.5 E-7	1.6 E-7
Vanadium	ne	7.0 E-8	7.6 E-8	7.0 E-8	7.6 E-8	ne	1.9 E-7	2.0 E-7	1.9 E-7	2.0 E-7
Zinc	ne	nd	nd	nd	nd	ne	7.5 E-7	8.1 E-7	7.5 E-7	8.1 E-7
Cyanide	ne	nd	nd	nd	nd	ne	1.7 E-9	1.8 E-9	1.7 E-9	1.8 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	2.9 E-9	3.1 E-9	2.9 E-9	3.1 E-9
Chloroethane	ne	nd	nd	nd	nd	ne	7.2 E-9	7.8 E-9	7.2 E-9	7.8 E-9
Methylene Chloride	ne	nd	nd	nd	nd	ne	7.2 E-10	7.8 E-10	7.2 E-10	7.8 E-10
Acetone	ne	nd	nd	nd	nd	ne	4.2 E-9	4.5 E-9	4.2 E-9	4.5 E-9
Carbon Disulfide	ne	4.2 E-9	4.6 E-9	4.2 E-9	4.6 E-9	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	1.2 E-8	1.3 E-8	1.2 E-8	1.3 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	5.2 E-9	5.6 E-9	5.2 E-9	5.6 E-9
Chloroform	ne	nd	nd	nd	nd	ne	3.1 E-6	3.3 E-6	3.1 E-6	3.3 E-6
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	1.6 E-8	1.7 E-8	1.6 E-8	1.7 E-8
2-Butanone	ne	nd	nd	nd	nd	ne	2.2 E-9	2.3 E-9	2.2 E-9	2.3 E-9
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	1.7 E-6	1.8 E-6	1.7 E-6	1.8 E-6
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	1.5 E-6	1.6 E-6	1.5 E-6	1.6 E-6
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	2.7 E-5	3.0 E-5	2.7 E-5	3.0 E-5
Trichloroethene	ne	nd	nd	nd	nd	ne	4.6 E-6	4.9 E-6	4.6 E-6	4.9 E-6
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	2.7 E-5	2.9 E-5	2.7 E-5	2.9 E-5
Benzene	ne	nd	nd	nd	nd	ne	3.0 E-6	3.2 E-6	3.0 E-6	3.2 E-6
Tetrachloroethene	ne	nd	nd	nd	nd	ne	5.0 E-7	5.4 E-7	5.0 E-7	5.4 E-7
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.5 E-6	4.9 E-6	4.5 E-6	4.9 E-6
Toluene	ne	nd	nd	nd	nd	ne	5.1 E-4	5.5 E-4	5.1 E-4	5.5 E-4

TABLE 3-32
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	1.9 E-7	2.0 E-7	1.9 E-7	2.0 E-7
Ethylbenzene	ne	nd	nd	nd	nd	ne	3.7 E-7	4.0 E-7	3.7 E-7	4.0 E-7
Xylene (total)	ne	4.2 E-8	4.6 E-8	4.2 E-8	4.6 E-8	ne	3.1 E-6	3.3 E-6	3.1 E-6	3.3 E-6
Phenol	ne	1.1 E-7	1.2 E-7	1.1 E-7	1.2 E-7	ne	7.8 E-6	8.4 E-6	7.8 E-6	8.4 E-6
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	8.7 E-7	9.4 E-7	8.7 E-7	9.4 E-7
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	4.6 E-8	5.0 E-8	4.6 E-8	5.0 E-8
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	3.3 E-6	3.6 E-6	3.3 E-6	3.6 E-6
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	3.0 E-8	3.2 E-8	3.0 E-8	3.2 E-8
2-Methylphenol	ne	nd	nd	nd	nd	ne	4.8 E-7	5.2 E-7	4.8 E-7	5.2 E-7
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	7.2 E-7	7.8 E-7	7.2 E-7	7.8 E-7
Naphthalene	ne	nd	nd	nd	nd	ne	4.1 E-7	4.4 E-7	4.1 E-7	4.4 E-7
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	6.6 E-8	7.1 E-8	6.6 E-8	7.1 E-8
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	5.7 E-8	6.1 E-8	5.7 E-8	6.1 E-8	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	2.6 E-8	2.8 E-8	2.6 E-8	2.8 E-8
Di-n-Butylphthalate	ne	1.4 E-7	1.5 E-7	1.4 E-7	1.5 E-7	ne	5.2 E-9	5.7 E-9	5.2 E-9	5.7 E-9
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.6 E-7	1.8 E-7	1.6 E-7	1.8 E-7	ne	8.1 E-9	8.7 E-9	8.1 E-9	8.7 E-9
Di-n-Octyl Phthalate	ne	6.1 E-8	6.6 E-8	6.1 E-8	6.6 E-8	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	1.7 E-8	1.8 E-8	1.7 E-8	1.8 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	7.8 E-9	8.4 E-9	7.8 E-9	8.4 E-9
4,4'-DDT	ne	nd	nd	nd	nd	ne	2.3 E-10	2.4 E-10	2.3 E-10	2.4 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	1.8 E-10	1.9 E-10	1.8 E-10	1.9 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	1.9 E-6	2.0 E-6	1.9 E-6	2.0 E-6
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	3.7 E-8	4.0 E-8	3.7 E-8	4.0 E-8
Heptachloronorborene	ne	nd	nd	nd	nd	ne	1.9 E-7	2.1 E-7	1.9 E-7	2.1 E-7

nd = not detected or not calculated   ne = no exposure

TABLE 3-32
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	9.7 E-7	1.0 E-6	9.7 E-7	1.0 E-6
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-32
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	4.2 E-8	4.6 E-8	4.2 E-8	4.6 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	4.2 E-8	4.6 E-8	4.2 E-8	4.6 E-8
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	4.2 E-8	4.6 E-8	4.2 E-8	4.6 E-8
bis(2-Ethylhexyl)Phthalate	ne	6.7 E-7	7.2 E-7	6.7 E-7	7.2 E-7
Di-n-Octyl Phthalate	ne	5.1 E-8	5.5 E-8	5.1 E-8	5.5 E-8
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated ne = no exposure

TABLE 3-33
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.5 E-9	4.4 E-9	1.5 E-9	4.4 E-9
Arsenic	ne	nd	nd	nd	nd	ne	2.0 E-9	5.7 E-9	2.0 E-9	5.7 E-9
Barium	ne	1.9 E-7	5.6 E-7	1.9 E-7	5.6 E-7	ne	1.7 E-6	5.0 E-6	1.7 E-6	5.0 E-6
Cadmium	ne	nd	nd	nd	nd	ne	2.6 E-9	7.5 E-9	2.6 E-9	7.5 E-9
Chromium	ne	nd	nd	nd	nd	ne	1.6 E-10	4.7 E-10	1.6 E-10	4.7 E-10
Cobalt	ne	1.7 E-8	5.0 E-8	1.7 E-8	5.0 E-8	ne	1.5 E-10	4.2 E-10	1.5 E-10	4.2 E-10
Copper	ne	nd	nd	nd	nd	ne	5.2 E-9	1.5 E-8	5.2 E-9	1.5 E-8
Lead	ne	nd	nd	nd	nd	ne	2.3 E-8	6.6 E-8	2.3 E-8	6.6 E-8
Manganese	ne	nd	nd	nd	nd	ne	2.7 E-8	7.7 E-8	2.7 E-8	7.7 E-8
Nickel	ne	2.4 E-8	6.9 E-8	2.4 E-8	6.9 E-8	ne	3.3 E-8	9.4 E-8	3.3 E-8	9.4 E-8
Vanadium	ne	1.5 E-8	4.4 E-8	1.5 E-8	4.4 E-8	ne	4.1 E-8	1.2 E-7	4.1 E-8	1.2 E-7
Zinc	ne	nd	nd	nd	nd	ne	1.6 E-7	4.7 E-7	1.6 E-7	4.7 E-7
Cyanide	ne	nd	nd	nd	nd	ne	3.7 E-10	1.1 E-9	3.7 E-10	1.1 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	4.2 E-7	1.2 E-6	4.2 E-7	1.2 E-6
Chloroethane	ne	nd	nd	nd	nd	ne	1.1 E-6	3.1 E-6	1.1 E-6	3.1 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	1.1 E-7	3.1 E-7	1.1 E-7	3.1 E-7
Acetone	ne	nd	nd	nd	nd	ne	6.1 E-7	1.8 E-6	6.1 E-7	1.8 E-6
Carbon Disulfide	ne	6.2 E-7	1.8 E-6	6.2 E-7	1.8 E-6	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	1.8 E-6	5.1 E-6	1.8 E-6	5.1 E-6
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	7.6 E-7	2.2 E-6	7.6 E-7	2.2 E-6
Chloroform	ne	nd	nd	nd	nd	ne	4.5 E-4	1.3 E-3	4.5 E-4	1.3 E-3
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	2.3 E-6	6.6 E-6	2.3 E-6	6.6 E-6
2-Butanone	ne	nd	nd	nd	nd	ne	1.6 E-9	4.5 E-9	1.6 E-9	4.5 E-9
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	2.5 E-4	7.2 E-4	2.5 E-4	7.2 E-4
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	2.2 E-4	6.3 E-4	2.2 E-4	6.3 E-4
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	4.0 E-3	1.2 E-2	4.0 E-3	1.2 E-2
Trichloroethene	ne	nd	nd	nd	nd	ne	6.7 E-4	1.9 E-3	6.7 E-4	1.9 E-3
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	4.0 E-3	1.1 E-2	4.0 E-3	1.1 E-2
Benzene	ne	nd	nd	nd	nd	ne	4.8 E-5	1.4 E-4	4.8 E-5	1.4 E-4
Tetrachloroethene	ne	nd	nd	nd	nd	ne	7.3 E-5	2.1 E-4	7.3 E-5	2.1 E-4
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	6.7 E-4	1.9 E-3	6.7 E-4	1.9 E-3
Toluene	ne	nd	nd	nd	nd	ne	7.5 E-2	2.2 E-1	7.5 E-2	2.2 E-1

TABLE 3-33
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	2.7 E-5	7.9 E-5	2.7 E-5	7.9 E-5
Ethylbenzene	ne	nd	nd	nd	nd	ne	5.3 E-6	1.5 E-5	5.3 E-6	1.5 E-5
Xylene (total)	ne	6.2 E-7	1.8 E-6	6.2 E-7	1.8 E-6	ne	4.5 E-5	1.3 E-4	4.5 E-5	1.3 E-4
Phenol	ne	2.4 E-8	6.9 E-8	2.4 E-8	6.9 E-8	ne	1.7 E-6	4.9 E-6	1.7 E-6	4.9 E-6
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	1.9 E-7	5.5 E-7	1.9 E-7	5.5 E-7
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	1.0 E-8	2.9 E-8	1.0 E-8	2.9 E-8
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	7.3 E-7	2.1 E-6	7.3 E-7	2.1 E-6
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	6.5 E-9	1.9 E-8	6.5 E-9	1.9 E-8
2-Methylphenol	ne	nd	nd	nd	nd	ne	1.1 E-7	3.0 E-7	1.1 E-7	3.0 E-7
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	1.6 E-7	4.5 E-7	1.6 E-7	4.5 E-7
Naphthalene	ne	nd	nd	nd	nd	ne	8.9 E-8	2.6 E-7	8.9 E-8	2.6 E-7
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	1.4 E-8	4.1 E-8	1.4 E-8	4.1 E-8
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	1.2 E-8	3.6 E-8	1.2 E-8	3.6 E-8	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	5.7 E-9	1.6 E-8	5.7 E-9	1.6 E-8
Di-n-Butylphthalate	ne	3.1 E-8	8.9 E-8	3.1 E-8	8.9 E-8	ne	1.1 E-9	3.3 E-9	1.1 E-9	3.3 E-9
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	3.5 E-8	1.0 E-7	3.5 E-8	1.0 E-7	ne	1.8 E-9	5.1 E-9	1.8 E-9	5.1 E-9
Di-n-Octyl Phthalate	ne	1.3 E-8	3.8 E-8	1.3 E-8	3.8 E-8	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	3.7 E-9	1.1 E-8	3.7 E-9	1.1 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	1.7 E-9	4.9 E-9	1.7 E-9	4.9 E-9
4,4'-DDT	ne	nd	nd	nd	nd	ne	5.0 E-11	1.4 E-10	5.0 E-11	1.4 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	3.9 E-11	1.1 E-10	3.9 E-11	1.1 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	4.4 E-8	1.3 E-7	4.4 E-8	1.3 E-7
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	8.0 E-9	2.3 E-8	8.0 E-9	2.3 E-8
Heptachloronorborene	ne	nd	nd	nd	nd	ne	4.2 E-8	1.2 E-7	4.2 E-8	1.2 E-7

nd = not detected or not calculated   ne = no exposure

TABLE 3-33
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	2.1 E-7	6.1 E-7	2.1 E-7	6.1 E-7
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-33
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	9.3 E-9	2.7 E-8	9.3 E-9	2.7 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	9.3 E-9	2.7 E-8	9.3 E-9	2.7 E-8
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	9.3 E-9	2.7 E-8	9.3 E-9	2.7 E-8
bis(2-Ethylhexyl)Phthalate	ne	1.5 E-7	4.2 E-7	1.5 E-7	4.2 E-7
Di-n-Octyl Phthalate	ne	1.1 E-8	3.2 E-8	1.1 E-8	3.2 E-8
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-34
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	8.6 E-9	1.2 E-8	8.6 E-9	1.2 E-8
Arsenic	ne	nd	nd	nd	nd	ne	1.1 E-8	1.5 E-8	1.1 E-8	1.5 E-8
Barium	ne	1.1 E-6	1.5 E-6	1.1 E-6	1.5 E-6	ne	9.7 E-6	1.4 E-5	9.7 E-6	1.4 E-5
Cadmium	ne	nd	nd	nd	nd	ne	1.5 E-8	2.0 E-8	1.5 E-8	2.0 E-8
Chromium	ne	nd	nd	nd	nd	ne	6.9 E-10	1.0 E-9	6.9 E-10	1.0 E-9
Cobalt	ne	9.7 E-8	1.4 E-7	9.7 E-8	1.4 E-7	ne	8.1 E-10	1.1 E-9	8.1 E-10	1.1 E-9
Copper	ne	nd	nd	nd	nd	ne	2.9 E-8	4.0 E-8	2.9 E-8	4.0 E-8
Lead	ne	nd	nd	nd	nd	ne	1.3 E-7	1.8 E-7	1.3 E-7	1.8 E-7
Manganese	ne	nd	nd	nd	nd	ne	1.5 E-7	2.1 E-7	1.5 E-7	2.1 E-7
Nickel	ne	1.3 E-7	1.9 E-7	1.3 E-7	1.9 E-7	ne	1.8 E-7	2.6 E-7	1.8 E-7	2.6 E-7
Vanadium	ne	8.6 E-8	1.2 E-7	8.6 E-8	1.2 E-7	ne	2.3 E-7	3.2 E-7	2.3 E-7	3.2 E-7
Zinc	ne	nd	nd	nd	nd	ne	9.2 E-7	1.3 E-6	9.2 E-7	1.3 E-6
Cyanide	ne	nd	nd	nd	nd	ne	2.1 E-9	2.9 E-9	2.1 E-9	2.9 E-9
Vinyl Chloride	ne	nd	nd	nd	nd	ne	4.2 E-7	1.2 E-6	4.2 E-7	1.2 E-6
Chloroethane	ne	nd	nd	nd	nd	ne	1.1 E-6	3.1 E-6	1.1 E-6	3.1 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	1.1 E-7	3.1 E-7	1.1 E-7	3.1 E-7
Acetone	ne	nd	nd	nd	nd	ne	6.2 E-7	1.8 E-6	6.2 E-7	1.8 E-6
Carbon Disulfide	ne	6.3 E-7	1.8 E-6	6.3 E-7	1.8 E-6	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	1.8 E-6	5.1 E-6	1.8 E-6	5.1 E-6
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	7.6 E-7	2.2 E-6	7.6 E-7	2.2 E-6
Chloroform	ne	nd	nd	nd	nd	ne	4.6 E-4	1.3 E-3	4.6 E-4	1.3 E-3
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	2.3 E-6	6.6 E-6	2.3 E-6	6.6 E-6
2-Butanone	ne	nd	nd	nd	nd	ne	3.7 E-9	6.9 E-9	3.7 E-9	6.9 E-9
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	2.5 E-4	7.2 E-4	2.5 E-4	7.2 E-4
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	2.2 E-4	6.3 E-4	2.2 E-4	6.3 E-4
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	4.1 E-3	1.2 E-2	4.1 E-3	1.2 E-2
Trichloroethene	ne	nd	nd	nd	nd	ne	6.8 E-4	1.9 E-3	6.8 E-4	1.9 E-3
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	4.0 E-3	1.2 E-2	4.0 E-3	1.2 E-2
Benzene	ne	nd	nd	nd	nd	ne	5.1 E-5	1.4 E-4	5.1 E-5	1.4 E-4
Tetrachloroethene	ne	nd	nd	nd	nd	ne	7.4 E-5	2.1 E-4	7.4 E-5	2.1 E-4
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	6.7 E-4	1.9 E-3	6.7 E-4	1.9 E-3
Toluene	ne	nd	nd	nd	nd	ne	7.5 E-2	2.2 E-1	7.5 E-2	2.2 E-1

TABLE 3-34
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Mill Creek - Current					Mill Creek - Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	2.8 E-5	7.9 E-5	2.8 E-5	7.9 E-5
Ethylbenzene	ne	nd	nd	nd	nd	ne	5.7 E-6	1.6 E-5	5.7 E-6	1.6 E-5
Xylene (total)	ne	6.6 E-7	1.8 E-6	6.6 E-7	1.8 E-6	ne	4.8 E-5	1.3 E-4	4.8 E-5	1.3 E-4
Phenol	ne	1.3 E-7	1.9 E-7	1.3 E-7	1.9 E-7	ne	9.5 E-6	1.3 E-5	9.5 E-6	1.3 E-5
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	1.1 E-6	1.5 E-6	1.1 E-6	1.5 E-6
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	5.6 E-8	7.8 E-8	5.6 E-8	7.8 E-8
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	4.1 E-6	5.7 E-6	4.1 E-6	5.7 E-6
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	3.6 E-8	5.1 E-8	3.6 E-8	5.1 E-8
2-Methylphenol	ne	nd	nd	nd	nd	ne	5.9 E-7	8.3 E-7	5.9 E-7	8.3 E-7
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	8.8 E-7	1.2 E-6	8.8 E-7	1.2 E-6
Naphthalene	ne	nd	nd	nd	nd	ne	5.0 E-7	6.9 E-7	5.0 E-7	6.9 E-7
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	8.0 E-8	1.1 E-7	8.0 E-8	1.1 E-7
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	6.9 E-8	9.7 E-8	6.9 E-8	9.7 E-8	ne	nd	nd	nd	nd
Pentachlorophenol	ne	nd	nd	nd	nd	ne	3.2 E-8	4.5 E-8	3.2 E-8	4.5 E-8
Di-n-Butylphthalate	ne	1.7 E-7	2.4 E-7	1.7 E-7	2.4 E-7	ne	6.4 E-9	8.9 E-9	6.4 E-9	8.9 E-9
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	2.0 E-7	2.8 E-7	2.0 E-7	2.8 E-7	ne	9.9 E-9	1.4 E-8	9.9 E-9	1.4 E-8
Di-n-Octyl Phthalate	ne	7.4 E-8	1.0 E-7	7.4 E-8	1.0 E-7	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	2.1 E-8	2.9 E-8	2.1 E-8	2.9 E-8
Dieldrin	ne	nd	nd	nd	nd	ne	9.5 E-9	1.3 E-8	9.5 E-9	1.3 E-8
4,4'-DDT	ne	nd	nd	nd	nd	ne	2.8 E-10	3.9 E-10	2.8 E-10	3.9 E-10
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.2 E-10	3.0 E-10	2.2 E-10	3.0 E-10
Hexachlorobenzene	ne	nd	nd	nd	nd	ne	1.9 E-6	2.2 E-6	1.9 E-6	2.2 E-6
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	4.5 E-8	6.3 E-8	4.5 E-8	6.3 E-8
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.4 E-7	3.3 E-7	2.4 E-7	3.3 E-7

nd = not detected or not calculated   ne = no exposure

TABLE 3-34
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd
Arsenic	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd
Cadmium	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd
Manganese	ne	1.2 E-6	1.7 E-6	1.2 E-6	1.7 E-6
Nickel	ne	nd	nd	nd	nd
Vanadium	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd

TABLE 3-34
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SURFACE WATER
(mg/kg/day)

Chemical	Skinner Creek - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	5.2 E-8	7.2 E-8	5.2 E-8	7.2 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd
Diethylphthalate	ne	5.2 E-8	7.2 E-8	5.2 E-8	7.2 E-8
Pentachlorophenol	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	5.2 E-8	7.2 E-8	5.2 E-8	7.2 E-8
bis(2-Ethylhexyl)Phthalate	ne	8.1 E-7	1.1 E-6	8.1 E-7	1.1 E-6
Di-n-Octyl Phthalate	ne	6.2 E-8	8.7 E-8	6.2 E-8	8.7 E-8
Aldrin	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-35
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	7.6 E-4	1.6 E-4	7.6 E-4	1.6 E-4
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	6.6 E-6	1.4 E-6	6.6 E-6	1.4 E-6
Cadmium	ne	9.6 E-7	2.1 E-7	9.6 E-7	2.1 E-7	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	1.4 E-6	3.0 E-7	1.4 E-6	3.0 E-7	ne	nd	nd	nd	nd
Vanadium	ne	1.6 E-6	3.5 E-7	1.6 E-6	3.5 E-7	ne	1.7 E-6	3.7 E-7	1.7 E-6	3.7 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-35
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	3.6 E-7	7.8 E-8	3.6 E-7	7.8 E-8	ne	1.7 E-7	3.6 E-8	1.7 E-7	3.6 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	1.7 E-7	3.6 E-8	1.7 E-7	3.6 E-8
Diethylphthalate	ne	nd	nd	nd	nd	ne	3.3 E-7	7.1 E-8	3.3 E-7	7.1 E-8
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	6.8 E-6	1.5 E-6	6.8 E-6	1.5 E-6	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	5.4 E-9	1.2 E-9	5.4 E-9	1.2 E-9	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	1.3 E-9	2.8 E-10	1.3 E-9	2.8 E-10	ne	1.8 E-9	3.9 E-10	1.8 E-9	3.9 E-10
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated ne = no exposure

TABLE 3-36
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.7 E-4	9.6 E-5	1.7 E-4	9.6 E-5
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	1.4 E-6	8.3 E-7	1.4 E-6	8.3 E-7
Cadmium	ne	2.1 E-7	1.2 E-7	2.1 E-7	1.2 E-7	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	3.0 E-7	1.7 E-7	3.0 E-7	1.7 E-7	ne	nd	nd	nd	nd
Vanadium	ne	3.6 E-7	2.1 E-7	3.6 E-7	2.1 E-7	ne	3.8 E-7	2.2 E-7	3.8 E-7	2.2 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-36
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	7.9 E-8	4.6 E-8	7.9 E-8	4.6 E-8	ne	3.6 E-8	2.1 E-8	3.6 E-8	2.1 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	3.6 E-8	2.1 E-8	3.6 E-8	2.1 E-8
Diethylphthalate	ne	nd	nd	nd	nd	ne	7.2 E-8	4.1 E-8	7.2 E-8	4.1 E-8
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.5 E-6	8.5 E-7	1.5 E-6	8.5 E-7	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	1.3 E-10	7.3 E-11	1.3 E-10	7.3 E-11	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	2.9 E-10	1.7 E-10	2.9 E-10	1.7 E-10	ne	4.0 E-10	2.3 E-10	4.0 E-10	2.3 E-10
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated ne = no exposure

TABLE 3-37
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	9.3 E-4	2.6 E-4	9.3 E-4	2.6 E-4
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	8.0 E-6	2.3 E-6	8.0 E-6	2.3 E-6
Cadmium	ne	1.2 E-6	3.3 E-7	1.2 E-6	3.3 E-7	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	1.7 E-6	4.7 E-7	1.7 E-6	4.7 E-7	ne	nd	nd	nd	nd
Vanadium	ne	2.0 E-6	5.6 E-7	2.0 E-6	5.6 E-7	ne	2.1 E-6	5.9 E-7	2.1 E-6	5.9 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-37
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	4.4 E-7	1.2 E-7	4.4 E-7	1.2 E-7	ne	2.0 E-7	5.6 E-8	2.0 E-7	5.6 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	2.0 E-7	5.6 E-8	2.0 E-7	5.6 E-8
Diethylphthalate	ne	nd	nd	nd	nd	ne	4.0 E-7	1.1 E-7	4.0 E-7	1.1 E-7
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	8.2 E-6	2.3 E-6	8.2 E-6	2.3 E-6	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	5.6 E-9	1.2 E-9	5.6 E-9	1.2 E-9	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	1.6 E-9	4.5 E-10	1.6 E-9	4.5 E-10	ne	2.2 E-9	6.2 E-10	2.2 E-9	6.2 E-10
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-38
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	6.5 E-5	7.0 E-5	6.5 E-5	7.0 E-5
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	5.7 E-7	6.1 E-7	5.7 E-7	6.1 E-7
Cadmium	ne	8.2 E-8	8.9 E-8	8.2 E-8	8.9 E-8	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	1.2 E-7	1.3 E-7	1.2 E-7	1.3 E-7	ne	nd	nd	nd	nd
Vanadium	ne	1.4 E-7	1.5 E-7	1.4 E-7	1.5 E-7	ne	1.5 E-7	1.6 E-7	1.5 E-7	1.6 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-38
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	3.1 E-8	3.4 E-8	3.1 E-8	3.4 E-8	ne	1.4 E-8	1.5 E-8	1.4 E-8	1.5 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	1.4 E-8	1.5 E-8	1.4 E-8	1.5 E-8
Diethylphthalate	ne	nd	nd	nd	nd	ne	2.8 E-8	3.1 E-8	2.8 E-8	3.1 E-8
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	5.8 E-7	6.2 E-7	5.8 E-7	6.2 E-7	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	4.7 E-10	5.0 E-10	4.7 E-10	5.0 E-10	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	1.1 E-10	1.2 E-10	1.1 E-10	1.2 E-10	ne	1.6 E-10	1.7 E-10	1.6 E-10	1.7 E-10
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-39
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.4 E-5	4.1 E-5	1.4 E-5	4.1 E-5
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	1.2 E-7	3.5 E-7	1.2 E-7	3.5 E-7
Cadmium	ne	1.8 E-8	5.2 E-8	1.8 E-8	5.2 E-8	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	2.6 E-8	7.5 E-8	2.6 E-8	7.5 E-8	ne	nd	nd	nd	nd
Vanadium	ne	3.1 E-8	8.8 E-8	3.1 E-8	8.8 E-8	ne	3.2 E-8	9.2 E-8	3.2 E-8	9.2 E-8
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-39
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	6.8 E-9	2.0 E-8	6.8 E-9	2.0 E-8	ne	3.1 E-9	8.9 E-9	3.1 E-9	8.9 E-9
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	3.1 E-9	8.9 E-9	3.1 E-9	8.9 E-9
Diethylphthalate	ne	nd	nd	nd	nd	ne	6.2 E-9	1.8 E-8	6.2 E-9	1.8 E-8
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.3 E-7	3.6 E-7	1.3 E-7	3.6 E-7	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	1.1 E-11	3.1 E-11	1.1 E-11	3.1 E-11	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	2.5 E-11	7.1 E-11	2.5 E-11	7.1 E-11	ne	3.4 E-11	9.8 E-11	3.4 E-11	9.8 E-11
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-40
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	7.9 E-5	1.1 E-4	7.9 E-5	1.1 E-4
Arsenic	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Barium	ne	nd	nd	nd	nd	ne	6.9 E-7	9.6 E-7	6.9 E-7	9.6 E-7
Cadmium	ne	1.0 E-7	1.4 E-7	1.0 E-7	1.4 E-7	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Manganese	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	1.4 E-7	2.0 E-7	1.4 E-7	2.0 E-7	ne	nd	nd	nd	nd
Vanadium	ne	1.7 E-7	2.4 E-7	1.7 E-7	2.4 E-7	ne	1.8 E-7	2.5 E-7	1.8 E-7	2.5 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cyanide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Vinyl Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chloroform	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,1-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Tetrachloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloropropane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2-Trichloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tetrachloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Toluene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

TABLE 3-40
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SURFACE WATER
(mg/kg/day)

Chemical	Diving Pond - Current & Future					Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Chlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	3.8 E-8	5.3 E-8	3.8 E-8	5.3 E-8	ne	1.7 E-8	2.4 E-8	1.7 E-8	2.4 E-8
bis(2-Chloroethyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,4-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzyl Alcohol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichlorobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Chloroisopropyl)Ether	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dimethyl Phthalate	ne	nd	nd	nd	nd	ne	1.7 E-8	2.4 E-8	1.7 E-8	2.4 E-8
Diethylphthalate	ne	nd	nd	nd	nd	ne	3.4 E-8	4.8 E-8	3.4 E-8	4.8 E-8
Pentachlorophenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Butylbenzylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	7.1 E-7	9.9 E-7	7.1 E-7	9.9 E-7	ne	nd	nd	nd	nd
Di-n-Octyl Phthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dieldrin	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDT	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	4.8 E-10	5.3 E-10	4.8 E-10	5.3 E-10	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	1.4 E-10	1.9 E-10	1.4 E-10	1.9 E-10	ne	1.9 E-10	2.7 E-10	1.9 E-10	2.7 E-10
Heptachloronorborene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-41
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	3.4 E-4	3.7 E-5	3.4 E-4	3.7 E-5
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	5.9 E-7	6.4 E-8	5.9 E-7	6.4 E-8	ne	2.0 E-6	2.2 E-7	2.0 E-6	2.2 E-7
Mercury	ne	3.6 E-9	3.9 E-10	3.6 E-9	3.9 E-10	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	1.5 E-6	1.6 E-7	1.5 E-6	1.6 E-7
Vanadium	ne	nd	nd	nd	nd	ne	7.6 E-7	8.2 E-8	7.6 E-7	8.2 E-8
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	3.5 E-10	3.7 E-11	3.5 E-10	3.7 E-11	ne	8.9 E-10	9.6 E-11	8.9 E-10	9.6 E-11
Carbon Disulfide	ne	3.9 E-11	4.2 E-12	3.9 E-11	4.2 E-12	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	2.3 E-9	2.5 E-10	2.3 E-9	2.5 E-10
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	3.3 E-10	3.6 E-11	3.3 E-10	3.6 E-11
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	4.5 E-11	4.8 E-12	4.5 E-11	4.8 E-12	ne	1.4 E-10	1.5 E-11	1.4 E-10	1.5 E-11
2-Hexanone	ne	nd	nd	nd	nd	ne	1.4 E-10	1.5 E-11	1.4 E-10	1.5 E-11
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	5.6 E-11	6.0 E-12	5.6 E-11	6.0 E-12
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10	ne	nd	nd	nd	nd
4-Methylphenol	ne	2.0 E-8	2.1 E-9	2.0 E-8	2.1 E-9	ne	5.3 E-10	5.8 E-11	5.3 E-10	5.8 E-11
Nitrobenzene	ne	nd	nd	nd	nd	ne	1.2 E-10	1.3 E-11	1.2 E-10	1.3 E-11
Naphthalene	ne	1.1 E-8	1.1 E-9	1.1 E-8	1.1 E-9	ne	1.8 E-9	2.0 E-10	1.8 E-9	2.0 E-10
2-Methylnaphthalene	ne	1.3 E-9	1.4 E-10	1.3 E-9	1.4 E-10	ne	2.8 E-9	3.0 E-10	2.8 E-9	3.0 E-10
Acenaphthylene	ne	3.4 E-9	3.6 E-10	3.4 E-9	3.6 E-10	ne	nd	nd	nd	nd
Acenaphthene	ne	9.4 E-9	1.0 E-9	9.4 E-9	1.0 E-9	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10

TABLE 3-41
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	7.8 E-9	8.4 E-10	7.8 E-9	8.4 E-10	ne	3.6 E-9	3.9 E-10	3.6 E-9	3.9 E-10
Diethylphthalate	ne	1.4 E-9	1.6 E-10	1.4 E-9	1.6 E-10	ne	7.9 E-10	8.5 E-11	7.9 E-10	8.5 E-11
Fluorene	ne	1.1 E-8	1.2 E-9	1.1 E-8	1.2 E-9	ne	6.1 E-9	6.6 E-10	6.1 E-9	6.6 E-10
Phenanthrene	ne	2.7 E-8	2.9 E-9	2.7 E-8	2.9 E-9	ne	5.0 E-8	5.4 E-9	5.0 E-8	5.4 E-9
Anthracene	ne	1.2 E-8	1.3 E-9	1.2 E-8	1.3 E-9	ne	8.7 E-9	9.3 E-10	8.7 E-9	9.3 E-10
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	4.5 E-9	4.8 E-10	4.5 E-9	4.8 E-10
Fluoranthene	ne	4.1 E-8	4.5 E-9	4.1 E-8	4.5 E-9	ne	7.0 E-8	7.5 E-9	7.0 E-8	7.5 E-9
Pyrene	ne	3.5 E-8	3.8 E-9	3.5 E-8	3.8 E-9	ne	4.2 E-8	4.5 E-9	4.2 E-8	4.5 E-9
Benzo(a)Anthracene	ne	1.9 E-8	2.1 E-9	1.9 E-8	2.1 E-9	ne	1.9 E-8	2.0 E-9	1.9 E-8	2.0 E-9
Chrysene	ne	2.3 E-8	2.5 E-9	2.3 E-8	2.5 E-9	ne	1.9 E-8	2.1 E-9	1.9 E-8	2.1 E-9
bis(2-Ethylhexyl)Phthalate	ne	5.0 E-9	5.4 E-10	5.0 E-9	5.4 E-10	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	2.6 E-8	2.8 E-9	2.6 E-8	2.8 E-9	ne	1.4 E-8	1.5 E-9	1.4 E-8	1.5 E-9
Benzo(k)Fluoranthene	ne	1.9 E-8	2.0 E-9	1.9 E-8	2.0 E-9	ne	1.4 E-8	1.5 E-9	1.4 E-8	1.5 E-9
Benzo(a)Pyrene	ne	1.9 E-8	2.1 E-9	1.9 E-8	2.1 E-9	ne	9.2 E-9	9.9 E-10	9.2 E-9	9.9 E-10
Indeno(1,2,3-cd)Pyrene	ne	1.1 E-8	1.2 E-9	1.1 E-8	1.2 E-9	ne	7.3 E-9	7.8 E-10	7.3 E-9	7.8 E-10
Dibenzo(a,h)Anthracene	ne	3.6 E-9	3.9 E-10	3.6 E-9	3.9 E-10	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	1.1 E-8	1.2 E-9	1.1 E-8	1.2 E-9	ne	5.9 E-9	6.3 E-10	5.9 E-9	6.3 E-10
beta-BHC	ne	7.8 E-10	8.4 E-11	7.8 E-10	8.4 E-11	ne	nd	nd	nd	nd
4,4'-DDD	ne	1.1 E-10	1.1 E-11	1.1 E-10	1.1 E-11	ne	nd	nd	nd	nd
alpha-Chlordane	ne	1.2 E-10	1.3 E-11	1.2 E-10	1.3 E-11	ne	nd	nd	nd	nd
Aroclor-1254	ne	4.5 E-9	4.8 E-10	4.5 E-9	4.8 E-10	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	8.3 E-10	9.0 E-11	8.3 E-10	9.0 E-11
Hexachlorobenzene	ne	4.5 E-10	4.8 E-11	4.5 E-10	4.8 E-11	ne	8.4 E-11	9.0 E-12	8.4 E-11	9.0 E-12
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	1.9 E-9	2.0 E-10	1.9 E-9	2.0 E-10
Hexachlorobutadiene	ne	5.3 E-11	5.7 E-12	5.3 E-11	5.7 E-12	ne	7.5 E-10	8.1 E-11	7.5 E-10	8.1 E-11
Octachlorocyclopentene	ne	1.8 E-10	2.0 E-11	1.8 E-10	2.0 E-11	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	8.1 E-10	8.7 E-11	8.1 E-10	8.7 E-11
Chlordene	ne	5.6 E-11	6.0 E-12	5.6 E-11	6.0 E-12	ne	1.4 E-10	1.5 E-11	1.4 E-10	1.5 E-11

ne = no exposure nd = not detected or not calculated

TABLE 3-42
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.2 E-3	6.1 E-4	1.2 E-3	6.1 E-4
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	2.0 E-6	1.1 E-6	2.0 E-6	1.1 E-6	ne	6.9 E-6	3.6 E-6	6.9 E-6	3.6 E-6
Mercury	ne	1.2 E-8	6.5 E-9	1.2 E-8	6.5 E-9	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	4.9 E-6	2.6 E-6	4.9 E-6	2.6 E-6
Vanadium	ne	nd	nd	nd	nd	ne	2.6 E-6	1.4 E-6	2.6 E-6	1.4 E-6
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	2.9 E-8	1.5 E-8	2.9 E-8	1.5 E-8	ne	7.5 E-8	3.9 E-8	7.5 E-8	3.9 E-8
Carbon Disulfide	ne	3.3 E-9	1.7 E-9	3.3 E-9	1.7 E-9	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	2.0 E-7	1.0 E-7	2.0 E-7	1.0 E-7
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	2.8 E-8	1.5 E-8	2.8 E-8	1.5 E-8
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	3.8 E-9	2.0 E-9	3.8 E-9	2.0 E-9	ne	1.2 E-8	6.1 E-9	1.2 E-8	6.1 E-9
2-Hexanone	ne	nd	nd	nd	nd	ne	1.2 E-8	6.4 E-9	1.2 E-8	6.4 E-9
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.7 E-9	2.5 E-9	4.7 E-9	2.5 E-9
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8	ne	nd	nd	nd	nd
4-Methylphenol	ne	6.7 E-7	3.5 E-7	6.7 E-7	3.5 E-7	ne	1.8 E-8	9.5 E-9	1.8 E-8	9.5 E-9
Nitrobenzene	ne	nd	nd	nd	nd	ne	4.0 E-9	2.1 E-9	4.0 E-9	2.1 E-9
Naphthalene	ne	3.6 E-7	1.9 E-7	3.6 E-7	1.9 E-7	ne	6.1 E-8	3.2 E-8	6.1 E-8	3.2 E-8
2-Methylnaphthalene	ne	4.3 E-8	2.2 E-8	4.3 E-8	2.2 E-8	ne	9.5 E-8	5.0 E-8	9.5 E-8	5.0 E-8
Acenaphthylene	ne	1.1 E-7	6.0 E-8	1.1 E-7	6.0 E-8	ne	nd	nd	nd	nd
Acenaphthene	ne	3.2 E-7	1.7 E-7	3.2 E-7	1.7 E-7	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8

TABLE 3-42
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	2.7 E-7	1.4 E-7	2.7 E-7	1.4 E-7	ne	1.2 E-7	6.5 E-8	1.2 E-7	6.5 E-8
Diethylphthalate	ne	4.9 E-8	2.6 E-8	4.9 E-8	2.6 E-8	ne	2.7 E-8	1.4 E-8	2.7 E-8	1.4 E-8
Fluorene	ne	3.7 E-7	1.9 E-7	3.7 E-7	1.9 E-7	ne	2.1 E-7	1.1 E-7	2.1 E-7	1.1 E-7
Phenanthrene	ne	9.0 E-7	4.7 E-7	9.0 E-7	4.7 E-7	ne	1.7 E-6	9.0 E-7	1.7 E-6	9.0 E-7
Anthracene	ne	4.0 E-7	2.1 E-7	4.0 E-7	2.1 E-7	ne	2.9 E-7	1.5 E-7	2.9 E-7	1.5 E-7
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	1.5 E-7	8.0 E-8	1.5 E-7	8.0 E-8
Fluoranthene	ne	1.4 E-6	7.4 E-7	1.4 E-6	7.4 E-7	ne	2.4 E-6	1.2 E-6	2.4 E-6	1.2 E-6
Pyrene	ne	1.2 E-6	6.3 E-7	1.2 E-6	6.3 E-7	ne	1.4 E-6	7.5 E-7	1.4 E-6	7.5 E-7
Benzo(a)Anthracene	ne	6.6 E-7	3.5 E-7	6.6 E-7	3.5 E-7	ne	6.4 E-7	3.4 E-7	6.4 E-7	3.4 E-7
Chrysene	ne	7.9 E-7	4.2 E-7	7.9 E-7	4.2 E-7	ne	6.5 E-7	3.4 E-7	6.5 E-7	3.4 E-7
bis(2-Ethylhexyl)Phthalate	ne	1.7 E-7	9.0 E-8	1.7 E-7	9.0 E-8	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	8.8 E-7	4.6 E-7	8.8 E-7	4.6 E-7	ne	4.8 E-7	2.5 E-7	4.8 E-7	2.5 E-7
Benzo(k)Fluoranthene	ne	6.3 E-7	3.3 E-7	6.3 E-7	3.3 E-7	ne	4.8 E-7	2.5 E-7	4.8 E-7	2.5 E-7
Benzo(a)Pyrene	ne	6.6 E-7	3.5 E-7	6.6 E-7	3.5 E-7	ne	3.1 E-7	1.6 E-7	3.1 E-7	1.6 E-7
Indeno(1,2,3-cd)Pyrene	ne	3.8 E-7	2.0 E-7	3.8 E-7	2.0 E-7	ne	2.5 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Dibenzo(a,h)Anthracene	ne	1.2 E-7	6.5 E-8	1.2 E-7	6.5 E-8	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	3.7 E-7	1.9 E-7	3.7 E-7	1.9 E-7	ne	2.0 E-7	1.0 E-7	2.0 E-7	1.0 E-7
beta-BHC	ne	2.7 E-8	1.4 E-8	2.7 E-8	1.4 E-8	ne	nd	nd	nd	nd
4,4'-DDD	ne	3.6 E-9	1.9 E-9	3.6 E-9	1.9 E-9	ne	nd	nd	nd	nd
alpha-Chlordane	ne	4.0 E-9	2.1 E-9	4.0 E-9	2.1 E-9	ne	nd	nd	nd	nd
Aroclor-1254	ne	1.5 E-7	8.0 E-8	1.5 E-7	8.0 E-8	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	2.8 E-8	1.5 E-8	2.8 E-8	1.5 E-8
Hexachlorobenzene	ne	1.5 E-8	8.0 E-9	1.5 E-8	8.0 E-9	ne	2.8 E-9	1.5 E-9	2.8 E-9	1.5 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	6.3 E-8	3.3 E-8	6.3 E-8	3.3 E-8
Hexachlorobutadiene	ne	1.8 E-9	9.5 E-10	1.8 E-9	9.5 E-10	ne	2.6 E-8	1.3 E-8	2.6 E-8	1.3 E-8
Octachlorocyclopentene	ne	6.2 E-9	3.2 E-9	6.2 E-9	3.2 E-9	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.7 E-8	1.4 E-8	2.7 E-8	1.4 E-8
Chlordene	ne	1.9 E-9	1.0 E-9	1.9 E-9	1.0 E-9	ne	4.6 E-9	2.4 E-9	4.6 E-9	2.4 E-9

ne = no exposure

nd = not detected or not calculated

TABLE 3-43
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.5 E-3	6.5 E-4	1.5 E-3	6.5 E-4
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	2.6 E-6	1.1 E-6	2.6 E-6	1.1 E-6	ne	8.9 E-6	3.8 E-6	8.9 E-6	3.8 E-6
Mercury	ne	1.6 E-8	6.9 E-9	1.6 E-8	6.9 E-9	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	6.4 E-6	2.7 E-6	6.4 E-6	2.7 E-6
Vanadium	ne	nd	nd	nd	nd	ne	3.4 E-6	1.4 E-6	3.4 E-6	1.4 E-6
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	3.0 E-8	1.6 E-8	3.0 E-8	1.6 E-8	ne	7.6 E-8	4.0 E-8	7.6 E-8	4.0 E-8
Carbon Disulfide	ne	3.4 E-9	1.7 E-9	3.4 E-9	1.7 E-9	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	2.0 E-7	1.0 E-7	2.0 E-7	1.0 E-7
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	2.9 E-8	1.5 E-8	2.9 E-8	1.5 E-8
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	3.8 E-9	2.0 E-9	3.8 E-9	2.0 E-9	ne	1.2 E-8	6.1 E-9	1.2 E-8	6.1 E-9
2-Hexanone	ne	nd	nd	nd	nd	ne	1.2 E-8	6.4 E-9	1.2 E-8	6.4 E-9
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.8 E-9	2.5 E-9	4.8 E-9	2.5 E-9
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8	ne	nd	nd	nd	nd
4-Methylphenol	ne	6.9 E-7	3.5 E-7	6.9 E-7	3.5 E-7	ne	1.9 E-8	9.6 E-9	1.9 E-8	9.6 E-9
Nitrobenzene	ne	nd	nd	nd	nd	ne	4.1 E-9	2.1 E-9	4.1 E-9	2.1 E-9
Naphthalene	ne	3.7 E-7	1.9 E-7	3.7 E-7	1.9 E-7	ne	6.3 E-8	3.2 E-8	6.3 E-8	3.2 E-8
2-Methylnaphthalene	ne	4.4 E-8	2.3 E-8	4.4 E-8	2.3 E-8	ne	9.8 E-8	5.0 E-8	9.8 E-8	5.0 E-8
Acenaphthylene	ne	1.2 E-7	6.0 E-8	1.2 E-7	6.0 E-8	ne	nd	nd	nd	nd
Acenaphthene	ne	3.3 E-7	1.7 E-7	3.3 E-7	1.7 E-7	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8

TABLE 3-43
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	2.7 E-7	1.4 E-7	2.7 E-7	1.4 E-7	ne	1.3 E-7	6.5 E-8	1.3 E-7	6.5 E-8
Diethylphthalate	ne	5.0 E-8	2.6 E-8	5.0 E-8	2.6 E-8	ne	2.8 E-8	1.4 E-8	2.8 E-8	1.4 E-8
Fluorene	ne	3.8 E-7	2.0 E-7	3.8 E-7	2.0 E-7	ne	2.1 E-7	1.1 E-7	2.1 E-7	1.1 E-7
Phenanthrene	ne	9.3 E-7	4.8 E-7	9.3 E-7	4.8 E-7	ne	1.8 E-6	9.0 E-7	1.8 E-6	9.0 E-7
Anthracene	ne	4.2 E-7	2.1 E-7	4.2 E-7	2.1 E-7	ne	3.0 E-7	1.6 E-7	3.0 E-7	1.6 E-7
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	1.6 E-7	8.0 E-8	1.6 E-7	8.0 E-8
Fluoranthene	ne	1.4 E-6	7.4 E-7	1.4 E-6	7.4 E-7	ne	2.4 E-6	1.3 E-6	2.4 E-6	1.3 E-6
Pyrene	ne	1.2 E-6	6.3 E-7	1.2 E-6	6.3 E-7	ne	1.5 E-6	7.5 E-7	1.5 E-6	7.5 E-7
Benzo(a)Anthracene	ne	6.8 E-7	3.5 E-7	6.8 E-7	3.5 E-7	ne	6.6 E-7	3.4 E-7	6.6 E-7	3.4 E-7
Chrysene	ne	8.2 E-7	4.2 E-7	8.2 E-7	4.2 E-7	ne	6.7 E-7	3.5 E-7	6.7 E-7	3.5 E-7
bis(2-Ethylhexyl)Phthalate	ne	1.8 E-7	9.0 E-8	1.8 E-7	9.0 E-8	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	9.0 E-7	4.6 E-7	9.0 E-7	4.6 E-7	ne	5.0 E-7	2.6 E-7	5.0 E-7	2.6 E-7
Benzo(k)Fluoranthene	ne	6.5 E-7	3.4 E-7	6.5 E-7	3.4 E-7	ne	5.0 E-7	2.6 E-7	5.0 E-7	2.6 E-7
Benzo(a)Pyrene	ne	6.8 E-7	3.5 E-7	6.8 E-7	3.5 E-7	ne	3.2 E-7	1.7 E-7	3.2 E-7	1.7 E-7
Indeno(1,2,3-cd)Pyrene	ne	3.9 E-7	2.0 E-7	3.9 E-7	2.0 E-7	ne	2.5 E-7	1.3 E-7	2.5 E-7	1.3 E-7
Dibenzo(a,h)Anthracene	ne	1.3 E-7	6.5 E-8	1.3 E-7	6.5 E-8	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	3.8 E-7	2.0 E-7	3.8 E-7	2.0 E-7	ne	2.0 E-7	1.1 E-7	2.0 E-7	1.1 E-7
beta-BHC	ne	2.7 E-8	1.4 E-8	2.7 E-8	1.4 E-8	ne	nd	nd	nd	nd
4,4'-DDD	ne	3.7 E-9	1.9 E-9	3.7 E-9	1.9 E-9	ne	nd	nd	nd	nd
alpha-Chlordane	ne	4.1 E-9	2.1 E-9	4.1 E-9	2.1 E-9	ne	nd	nd	nd	nd
Aroclor-1254	ne	1.6 E-7	8.0 E-8	1.6 E-7	8.0 E-8	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	2.9 E-8	1.5 E-8	2.9 E-8	1.5 E-8
Hexachlorobenzene	ne	1.6 E-8	8.0 E-9	1.6 E-8	8.0 E-9	ne	2.9 E-9	1.5 E-9	2.9 E-9	1.5 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	6.5 E-8	3.4 E-8	6.5 E-8	3.4 E-8
Hexachlorobutadiene	ne	1.9 E-9	9.5 E-10	1.9 E-9	9.5 E-10	ne	2.6 E-8	1.4 E-8	2.6 E-8	1.4 E-8
Octachlorocyclopentene	ne	6.3 E-9	3.3 E-9	6.3 E-9	3.3 E-9	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.8 E-8	1.5 E-8	2.8 E-8	1.5 E-8
Chlordene	ne	2.0 E-9	1.0 E-9	2.0 E-9	1.0 E-9	ne	4.8 E-9	2.5 E-9	4.8 E-9	2.5 E-9

ne = no exposure

nd = not detected or not calculated

TABLE 3-44
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	2.9 E-5	1.6 E-5	2.9 E-5	1.6 E-5
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	5.1 E-8	2.7 E-8	5.1 E-8	2.7 E-8	ne	1.7 E-7	9.4 E-8	1.7 E-7	9.4 E-8
Mercury	ne	3.1 E-10	1.7 E-10	3.1 E-10	1.7 E-10	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	1.2 E-7	6.7 E-8	1.2 E-7	6.7 E-8
Vanadium	ne	nd	nd	nd	nd	ne	6.6 E-8	3.5 E-8	6.6 E-8	3.5 E-8
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	3.0 E-11	1.6 E-11	3.0 E-11	1.6 E-11	ne	7.6 E-11	4.1 E-11	7.6 E-11	4.1 E-11
Carbon Disulfide	ne	3.4 E-12	1.8 E-12	3.4 E-12	1.8 E-12	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	2.0 E-10	1.1 E-10	2.0 E-10	1.1 E-10
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	2.9 E-11	1.5 E-11	2.9 E-11	1.5 E-11
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	3.8 E-12	2.1 E-12	3.8 E-12	2.1 E-12	ne	1.2 E-11	6.3 E-12	1.2 E-11	6.3 E-12
2-Hexanone	ne	nd	nd	nd	nd	ne	1.2 E-11	6.6 E-12	1.2 E-11	6.6 E-12
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.8 E-12	2.6 E-12	4.8 E-12	2.6 E-12
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	3.3 E-10	1.8 E-10	3.3 E-10	1.8 E-10	ne	nd	nd	nd	nd
4-Methylphenol	ne	1.7 E-9	9.1 E-10	1.7 E-9	9.1 E-10	ne	4.6 E-11	2.5 E-11	4.6 E-11	2.5 E-11
Nitrobenzene	ne	nd	nd	nd	nd	ne	1.0 E-11	5.4 E-12	1.0 E-11	5.4 E-12
Naphthalene	ne	9.1 E-10	4.9 E-10	9.1 E-10	4.9 E-10	ne	1.6 E-10	8.4 E-11	1.6 E-10	8.4 E-11
2-Methylnaphthalene	ne	1.1 E-10	5.8 E-11	1.1 E-10	5.8 E-11	ne	2.4 E-10	1.3 E-10	2.4 E-10	1.3 E-10
Acenaphthylene	ne	2.9 E-10	1.5 E-10	2.9 E-10	1.5 E-10	ne	nd	nd	nd	nd
Acenaphthene	ne	8.1 E-10	4.4 E-10	8.1 E-10	4.4 E-10	ne	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10

TABLE 3-44
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	6.7 E-10	3.6 E-10	6.7 E-10	3.6 E-10	ne	3.1 E-10	1.7 E-10	3.1 E-10	1.7 E-10
Diethylphthalate	ne	1.2 E-10	6.7 E-11	1.2 E-10	6.7 E-11	ne	6.8 E-11	3.7 E-11	6.8 E-11	3.7 E-11
Fluorene	ne	9.3 E-10	5.0 E-10	9.3 E-10	5.0 E-10	ne	5.3 E-10	2.8 E-10	5.3 E-10	2.8 E-10
Phenanthrene	ne	2.3 E-9	1.2 E-9	2.3 E-9	1.2 E-9	ne	4.3 E-9	2.3 E-9	4.3 E-9	2.3 E-9
Anthracene	ne	1.0 E-9	5.5 E-10	1.0 E-9	5.5 E-10	ne	7.4 E-10	4.0 E-10	7.4 E-10	4.0 E-10
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	3.8 E-10	2.1 E-10	3.8 E-10	2.1 E-10
Fluoranthene	ne	3.6 E-9	1.9 E-9	3.6 E-9	1.9 E-9	ne	6.0 E-9	3.2 E-9	6.0 E-9	3.2 E-9
Pyrene	ne	3.0 E-9	1.6 E-9	3.0 E-9	1.6 E-9	ne	3.6 E-9	1.9 E-9	3.6 E-9	1.9 E-9
Benzo(a)Anthracene	ne	1.7 E-9	9.0 E-10	1.7 E-9	9.0 E-10	ne	1.6 E-9	8.8 E-10	1.6 E-9	8.8 E-10
Chrysene	ne	2.0 E-9	1.1 E-9	2.0 E-9	1.1 E-9	ne	1.7 E-9	8.9 E-10	1.7 E-9	8.9 E-10
bis(2-Ethylhexyl)Phthalate	ne	4.3 E-10	2.3 E-10	4.3 E-10	2.3 E-10	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	2.2 E-9	1.2 E-9	2.2 E-9	1.2 E-9	ne	1.2 E-9	6.6 E-10	1.2 E-9	6.6 E-10
Benzo(k)Fluoranthene	ne	1.6 E-9	8.7 E-10	1.6 E-9	8.7 E-10	ne	1.2 E-9	6.6 E-10	1.2 E-9	6.6 E-10
Benzo(a)Pyrene	ne	1.7 E-9	9.0 E-10	1.7 E-9	9.0 E-10	ne	7.9 E-10	4.3 E-10	7.9 E-10	4.3 E-10
Indeno(1,2,3-cd)Pyrene	ne	9.6 E-10	5.2 E-10	9.6 E-10	5.2 E-10	ne	6.2 E-10	3.4 E-10	6.2 E-10	3.4 E-10
Dibenzo(a,h)Anthracene	ne	3.1 E-10	1.7 E-10	3.1 E-10	1.7 E-10	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	9.4 E-10	5.0 E-10	9.4 E-10	5.0 E-10	ne	5.0 E-10	2.7 E-10	5.0 E-10	2.7 E-10
beta-BHC	ne	6.7 E-11	3.6 E-11	6.7 E-11	3.6 E-11	ne	nd	nd	nd	nd
4,4'-DDD	ne	9.1 E-12	4.9 E-12	9.1 E-12	4.9 E-12	ne	nd	nd	nd	nd
alpha-Chlordane	ne	1.0 E-11	5.4 E-12	1.0 E-11	5.4 E-12	ne	nd	nd	nd	nd
Aroclor-1254	ne	3.8 E-10	2.1 E-10	3.8 E-10	2.1 E-10	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	7.1 E-11	3.9 E-11	7.1 E-11	3.9 E-11
Hexachlorobenzene	ne	3.8 E-11	2.1 E-11	3.8 E-11	2.1 E-11	ne	7.2 E-12	3.9 E-12	7.2 E-12	3.9 E-12
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	1.6 E-10	8.7 E-11	1.6 E-10	8.7 E-11
Hexachlorobutadiene	ne	4.6 E-12	2.5 E-12	4.6 E-12	2.5 E-12	ne	6.5 E-11	3.5 E-11	6.5 E-11	3.5 E-11
Octachlorocyclopentene	ne	1.6 E-11	8.4 E-12	1.6 E-11	8.4 E-12	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	6.9 E-11	3.7 E-11	6.9 E-11	3.7 E-11
Chlordene	ne	4.8 E-12	2.6 E-12	4.8 E-12	2.6 E-12	ne	1.2 E-11	6.3 E-12	1.2 E-11	6.3 E-12

nd = not detected or not calculated   ne = no exposure

TABLE 3-45
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.0 E-4	2.6 E-4	1.0 E-4	2.6 E-4
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	1.7 E-7	4.5 E-7	1.7 E-7	4.5 E-7	ne	5.9 E-7	1.6 E-6	5.9 E-7	1.6 E-6
Mercury	ne	1.1 E-9	2.8 E-9	1.1 E-9	2.8 E-9	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	4.2 E-7	1.1 E-6	4.2 E-7	1.1 E-6
Vanadium	ne	nd	nd	nd	nd	ne	2.2 E-7	5.8 E-7	2.2 E-7	5.8 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	2.5 E-9	6.6 E-9	2.5 E-9	6.6 E-9	ne	6.4 E-9	1.7 E-8	6.4 E-9	1.7 E-8
Carbon Disulfide	ne	2.8 E-10	7.5 E-10	2.8 E-10	7.5 E-10	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	1.7 E-8	4.4 E-8	1.7 E-8	4.4 E-8
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	2.4 E-9	6.4 E-9	2.4 E-9	6.4 E-9
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	3.2 E-10	8.5 E-10	3.2 E-10	8.5 E-10	ne	9.9 E-10	2.6 E-9	9.9 E-10	2.6 E-9
2-Hexanone	ne	nd	nd	nd	nd	ne	1.0 E-9	2.7 E-9	1.0 E-9	2.7 E-9
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.1 E-10	1.1 E-9	4.1 E-10	1.1 E-9
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8	ne	nd	nd	nd	nd
4-Methylphenol	ne	5.7 E-8	1.5 E-7	5.7 E-8	1.5 E-7	ne	1.6 E-9	4.1 E-9	1.6 E-9	4.1 E-9
Nitrobenzene	ne	nd	nd	nd	nd	ne	3.4 E-10	9.0 E-10	3.4 E-10	9.0 E-10
Naphthalene	ne	3.1 E-8	8.1 E-8	3.1 E-8	8.1 E-8	ne	5.3 E-9	1.4 E-8	5.3 E-9	1.4 E-8
2-Methylnaphthalene	ne	3.7 E-9	9.6 E-9	3.7 E-9	9.6 E-9	ne	8.2 E-9	2.2 E-8	8.2 E-9	2.2 E-8
Acenaphthylene	ne	9.7 E-9	2.6 E-8	9.7 E-9	2.6 E-8	ne	nd	nd	nd	nd
Acenaphthene	ne	2.7 E-8	7.2 E-8	2.7 E-8	7.2 E-8	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8

TABLE 3-45
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	2.3 E-8	6.0 E-8	2.3 E-8	6.0 E-8	ne	1.1 E-8	2.8 E-8	1.1 E-8	2.8 E-8
Diethylphthalate	ne	4.2 E-9	1.1 E-8	4.2 E-9	1.1 E-8	ne	2.3 E-9	6.0 E-9	2.3 E-9	6.0 E-9
Fluorene	ne	3.2 E-8	8.3 E-8	3.2 E-8	8.3 E-8	ne	1.8 E-8	4.7 E-8	1.8 E-8	4.7 E-8
Phenanthrene	ne	7.7 E-8	2.0 E-7	7.7 E-8	2.0 E-7	ne	1.5 E-7	3.8 E-7	1.5 E-7	3.8 E-7
Anthracene	ne	3.5 E-8	9.1 E-8	3.5 E-8	9.1 E-8	ne	2.5 E-8	6.6 E-8	2.5 E-8	6.6 E-8
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8
Fluoranthene	ne	1.2 E-7	3.2 E-7	1.2 E-7	3.2 E-7	ne	2.0 E-7	5.3 E-7	2.0 E-7	5.3 E-7
Pyrene	ne	1.0 E-7	2.7 E-7	1.0 E-7	2.7 E-7	ne	1.2 E-7	3.2 E-7	1.2 E-7	3.2 E-7
Benzo(a)Anthracene	ne	5.7 E-8	1.5 E-7	5.7 E-8	1.5 E-7	ne	5.5 E-8	1.5 E-7	5.5 E-8	1.5 E-7
Chrysene	ne	6.8 E-8	1.8 E-7	6.8 E-8	1.8 E-7	ne	5.6 E-8	1.5 E-7	5.6 E-8	1.5 E-7
bis(2-Ethylhexyl)Phthalate	ne	1.5 E-8	3.8 E-8	1.5 E-8	3.8 E-8	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	7.5 E-8	2.0 E-7	7.5 E-8	2.0 E-7	ne	4.1 E-8	1.1 E-7	4.1 E-8	1.1 E-7
Benzo(k)Fluoranthene	ne	5.4 E-8	1.4 E-7	5.4 E-8	1.4 E-7	ne	4.1 E-8	1.1 E-7	4.1 E-8	1.1 E-7
Benzo(a)Pyrene	ne	5.6 E-8	1.5 E-7	5.6 E-8	1.5 E-7	ne	2.7 E-8	7.0 E-8	2.7 E-8	7.0 E-8
Indeno(1,2,3-cd)Pyrene	ne	3.3 E-8	8.6 E-8	3.3 E-8	8.6 E-8	ne	2.1 E-8	5.6 E-8	2.1 E-8	5.6 E-8
Dibenzo(a,h)Anthracene	ne	1.1 E-8	2.8 E-8	1.1 E-8	2.8 E-8	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	3.2 E-8	8.3 E-8	3.2 E-8	8.3 E-8	ne	1.7 E-8	4.5 E-8	1.7 E-8	4.5 E-8
beta-BHC	ne	2.3 E-9	6.0 E-9	2.3 E-9	6.0 E-9	ne	nd	nd	nd	nd
4,4'-DDD	ne	3.1 E-10	8.1 E-10	3.1 E-10	8.1 E-10	ne	nd	nd	nd	nd
alpha-Chlordane	ne	3.4 E-10	9.0 E-10	3.4 E-10	9.0 E-10	ne	nd	nd	nd	nd
Aroclor-1254	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	2.4 E-9	6.4 E-9	2.4 E-9	6.4 E-9
Hexachlorobenzene	ne	1.3 E-9	3.4 E-9	1.3 E-9	3.4 E-9	ne	2.4 E-10	6.4 E-10	2.4 E-10	6.4 E-10
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	5.4 E-9	1.4 E-8	5.4 E-9	1.4 E-8
Hexachlorobutadiene	ne	1.5 E-10	4.1 E-10	1.5 E-10	4.1 E-10	ne	2.2 E-9	5.8 E-9	2.2 E-9	5.8 E-9
Octachlorocyclopentene	ne	5.3 E-10	1.4 E-9	5.3 E-10	1.4 E-9	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.4 E-9	6.2 E-9	2.4 E-9	6.2 E-9
Chlordene	ne	1.6 E-10	4.3 E-10	1.6 E-10	4.3 E-10	ne	4.0 E-10	1.0 E-9	4.0 E-10	1.0 E-9

nd = not detected or not calculated   ne = no exposure

TABLE 3-46
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	nd	nd	nd	nd	ne	1.3 E-4	2.8 E-4	1.3 E-4	2.8 E-4
Barium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Cobalt	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Copper	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Lead	ne	2.2 E-7	4.8 E-7	2.2 E-7	4.8 E-7	ne	7.6 E-7	1.6 E-6	7.6 E-7	1.6 E-6
Mercury	ne	1.4 E-9	2.9 E-9	1.4 E-9	2.9 E-9	ne	nd	nd	nd	nd
Nickel	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Thallium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	5.5 E-7	1.2 E-6	5.5 E-7	1.2 E-6
Vanadium	ne	nd	nd	nd	nd	ne	2.9 E-7	6.2 E-7	2.9 E-7	6.2 E-7
Zinc	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	2.6 E-9	6.7 E-9	2.6 E-9	6.7 E-9	ne	6.5 E-9	1.7 E-8	6.5 E-9	1.7 E-8
Carbon Disulfide	ne	2.9 E-10	7.5 E-10	2.9 E-10	7.5 E-10	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	1.7 E-8	4.4 E-8	1.7 E-8	4.4 E-8
2-Butanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd	ne	2.4 E-9	6.4 E-9	2.4 E-9	6.4 E-9
Benzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	3.3 E-10	8.6 E-10	3.3 E-10	8.6 E-10	ne	1.0 E-9	2.6 E-9	1.0 E-9	2.6 E-9
2-Hexanone	ne	nd	nd	nd	nd	ne	1.0 E-9	2.7 E-9	1.0 E-9	2.7 E-9
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	4.1 E-10	1.1 E-9	4.1 E-10	1.1 E-9
Ethylbenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Phenol	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8	ne	nd	nd	nd	nd
4-Methylphenol	ne	5.9 E-8	1.5 E-7	5.9 E-8	1.5 E-7	ne	1.6 E-9	4.1 E-9	1.6 E-9	4.1 E-9
Nitrobenzene	ne	nd	nd	nd	nd	ne	3.5 E-10	9.0 E-10	3.5 E-10	9.0 E-10
Naphthalene	ne	3.2 E-8	8.2 E-8	3.2 E-8	8.2 E-8	ne	5.4 E-9	1.4 E-8	5.4 E-9	1.4 E-8
2-Methylnaphthalene	ne	3.8 E-9	9.7 E-9	3.8 E-9	9.7 E-9	ne	8.4 E-9	2.2 E-8	8.4 E-9	2.2 E-8
Acenaphthylene	ne	1.0 E-8	2.6 E-8	1.0 E-8	2.6 E-8	ne	nd	nd	nd	nd
Acenaphthene	ne	2.8 E-8	7.2 E-8	2.8 E-8	7.2 E-8	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8

TABLE 3-46
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM CREEK SEDIMENTS
(mg/kg/day)

Chemical	Mill Creek - Current & Future					Skinner Creek - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	2.3 E-8	6.0 E-8	2.3 E-8	6.0 E-8	ne	1.1 E-8	2.8 E-8	1.1 E-8	2.8 E-8
Diethylphthalate	ne	4.3 E-9	1.1 E-8	4.3 E-9	1.1 E-8	ne	2.4 E-9	6.1 E-9	2.4 E-9	6.1 E-9
Fluorene	ne	3.3 E-8	8.4 E-8	3.3 E-8	8.4 E-8	ne	1.8 E-8	4.7 E-8	1.8 E-8	4.7 E-8
Phenanthrene	ne	8.0 E-8	2.0 E-7	8.0 E-8	2.0 E-7	ne	1.5 E-7	3.9 E-7	1.5 E-7	3.9 E-7
Anthracene	ne	3.6 E-8	9.2 E-8	3.6 E-8	9.2 E-8	ne	2.6 E-8	6.7 E-8	2.6 E-8	6.7 E-8
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8
Fluoranthene	ne	1.2 E-7	3.2 E-7	1.2 E-7	3.2 E-7	ne	2.1 E-7	5.4 E-7	2.1 E-7	5.4 E-7
Pyrene	ne	1.1 E-7	2.7 E-7	1.1 E-7	2.7 E-7	ne	1.3 E-7	3.2 E-7	1.3 E-7	3.2 E-7
Benzo(a)Anthracene	ne	5.8 E-8	1.5 E-7	5.8 E-8	1.5 E-7	ne	5.7 E-8	1.5 E-7	5.7 E-8	1.5 E-7
Chrysene	ne	7.0 E-8	1.8 E-7	7.0 E-8	1.8 E-7	ne	5.8 E-8	1.5 E-7	5.8 E-8	1.5 E-7
bis(2-Ethylhexyl)Phthalate	ne	1.5 E-8	3.9 E-8	1.5 E-8	3.9 E-8	ne	nd	nd	nd	nd
Benzo(b)Fluoranthene	ne	7.7 E-8	2.0 E-7	7.7 E-8	2.0 E-7	ne	4.3 E-8	1.1 E-7	4.3 E-8	1.1 E-7
Benzo(k)Fluoranthene	ne	5.6 E-8	1.4 E-7	5.6 E-8	1.4 E-7	ne	4.3 E-8	1.1 E-7	4.3 E-8	1.1 E-7
Benzo(a)Pyrene	ne	5.8 E-8	1.5 E-7	5.8 E-8	1.5 E-7	ne	2.8 E-8	7.1 E-8	2.8 E-8	7.1 E-8
Indeno(1,2,3-cd)Pyrene	ne	3.4 E-8	8.6 E-8	3.4 E-8	8.6 E-8	ne	2.2 E-8	5.6 E-8	2.2 E-8	5.6 E-8
Dibenzo(a,h)Anthracene	ne	1.1 E-8	2.8 E-8	1.1 E-8	2.8 E-8	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	3.3 E-8	8.4 E-8	3.3 E-8	8.4 E-8	ne	1.8 E-8	4.5 E-8	1.8 E-8	4.5 E-8
beta-BHC	ne	2.3 E-9	6.0 E-9	2.3 E-9	6.0 E-9	ne	nd	nd	nd	nd
4,4'-DDD	ne	3.2 E-10	8.2 E-10	3.2 E-10	8.2 E-10	ne	nd	nd	nd	nd
alpha-Chlordane	ne	3.5 E-10	9.0 E-10	3.5 E-10	9.0 E-10	ne	nd	nd	nd	nd
Aroclor-1254	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd	ne	2.5 E-9	6.4 E-9	2.5 E-9	6.4 E-9
Hexachlorobenzene	ne	1.3 E-9	3.4 E-9	1.3 E-9	3.4 E-9	ne	2.5 E-10	6.4 E-10	2.5 E-10	6.4 E-10
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	5.6 E-9	1.4 E-8	5.6 E-9	1.4 E-8
Hexachlorobutadiene	ne	1.6 E-10	4.1 E-10	1.6 E-10	4.1 E-10	ne	2.3 E-9	5.8 E-9	2.3 E-9	5.8 E-9
Octachlorocyclopentene	ne	5.4 E-10	1.4 E-9	5.4 E-10	1.4 E-9	ne	nd	nd	nd	nd
Heptachloronorborene	ne	nd	nd	nd	nd	ne	2.4 E-9	6.2 E-9	2.4 E-9	6.2 E-9
Chlordene	ne	1.7 E-10	4.3 E-10	1.7 E-10	4.3 E-10	ne	4.1 E-10	1.1 E-9	4.1 E-10	1.1 E-9

nd = not detected or not calculated ne = no exposure

TABLE 3-47
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	7.0 E-4	7.5 E-5	7.0 E-4	7.5 E-5	ne	4.3 E-4	4.6 E-5	4.3 E-4	4.6 E-5
Barium	ne	5.8 E-6	6.3 E-7	5.8 E-6	6.3 E-7	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	8.3 E-7	9.0 E-8	8.3 E-7	9.0 E-8	ne	7.5 E-7	8.1 E-8	7.5 E-7	8.1 E-8
Cobalt	ne	5.2 E-7	5.6 E-8	5.2 E-7	5.6 E-8	ne	nd	nd	nd	nd
Copper	ne	8.2 E-7	8.8 E-8	8.2 E-7	8.8 E-8	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	1.4 E-5	1.5 E-6	1.4 E-5	1.5 E-6
Mercury	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	6.7 E-7	7.2 E-8	6.7 E-7	7.2 E-8	ne	nd	nd	nd	nd
Thallium	ne	1.7 E-8	1.8 E-9	1.7 E-8	1.8 E-9	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	1.3 E-6	1.4 E-7	1.3 E-6	1.4 E-7
Vanadium	ne	1.5 E-6	1.6 E-7	1.5 E-6	1.6 E-7	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	3.7 E-6	3.9 E-7	3.7 E-6	3.9 E-7
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	8.4 E-10	9.0 E-11	8.4 E-10	9.0 E-11
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	3.1 E-10	3.3 E-11	3.1 E-10	3.3 E-11
Trichloroethene	ne	nd	nd	nd	nd	ne	4.5 E-11	4.8 E-12	4.5 E-11	4.8 E-12
Benzene	ne	nd	nd	nd	nd	ne	1.1 E-9	1.2 E-10	1.1 E-9	1.2 E-10
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	2.1 E-9	2.2 E-10	2.1 E-9	2.2 E-10
Xylene (total)	ne	nd	nd	nd	nd	ne	7.3 E-9	7.9 E-10	7.3 E-9	7.9 E-10
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	1.4 E-8	1.5 E-9	1.4 E-8	1.5 E-9
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	4.5 E-9	4.8 E-10	4.5 E-9	4.8 E-10

TABLE 3-47
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10
Phenanthrene	ne	nd	nd	nd	nd	ne	1.6 E-8	1.8 E-9	1.6 E-8	1.8 E-9
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10
Pyrene	ne	nd	nd	nd	nd	ne	1.4 E-8	1.5 E-9	1.4 E-8	1.5 E-9
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	2.8 E-9	3.0 E-10	2.8 E-9	3.0 E-10
Chrysene	ne	nd	nd	nd	nd	ne	3.9 E-9	4.2 E-10	3.9 E-9	4.2 E-10
bis(2-Ethylhexyl)Phthalate	ne	2.2 E-9	2.4 E-10	2.2 E-9	2.4 E-10	ne	3.7 E-9	4.0 E-10	3.7 E-9	4.0 E-10
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	4.5 E-9	4.8 E-10	4.5 E-9	4.8 E-10
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	8.1 E-9	8.7 E-10	8.1 E-9	8.7 E-10
Aroclor-1260	ne	nd	nd	nd	nd	ne	1.2 E-8	1.3 E-9	1.2 E-8	1.3 E-9
Hexachlorobenzene	ne	8.9 E-11	9.6 E-12	8.9 E-11	9.6 E-12	ne	2.0 E-10	2.2 E-11	2.0 E-10	2.2 E-11
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	9.5 E-11	1.0 E-11	9.5 E-11	1.0 E-11
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	7.0 E-11	7.5 E-12	7.0 E-11	7.5 E-12	ne	1.0 E-10	1.1 E-11	1.0 E-10	1.1 E-11
Chlordene	ne	4.5 E-11	4.9 E-12	4.5 E-11	4.9 E-12	ne	nd	nd	nd	nd

ne = no exposure   nd = not detected or not calculated

TABLE 3-54

MAGNITUDE OF EXPOSURE ASSESSMENT UNCERTAINTIES

ASSUMPTION	EFFECT ON EXPOSURE*		
	POTENTIAL MAGNITUDE FOR OVER-ESTIMATION OF EXPOSURE	POTENTIAL MAGNITUDE FOR UNDER-ESTIMATION OF EXPOSURE	POTENTIAL MAGNITURE FOR OVER- OR UNDER ESTIMATION OF EXPOSURE
Environmental Sampling and Analysis			
Sufficient samples may not have been taken to characterize the media being evaluated, especially with respect to currently available soil data.			Low
Systematic or random errors in the chemical analyses may yield erroneous data.			Low
Exposure Pathway Selection			
Omission of air exposure pathway		Low to Moderate	
Omission of food exposure pathway		Low	
Exposure Parameter Estimation			
The standard assumptions regarding body weight, period exposed, life expectancy, population characteristics, and lifestyle may not be representative of any actual exposure situation.	Moderate		
The amount of media intake is assumed to be constant and representative of the exposed population.	Moderate		
Assumption of daily lifetime exposure for residents.	Moderate to High		

* As a general guideline, assumptions marked as "low" may affect estimates of exposure by less than one order of magnitude; assumptions marked "moderate" may affect estimates of exposure by between one and two orders of magnitude; and assumptions marked "high" may affect estimates of exposure by more than two orders of magnitude.

TABLE 3-53
SUMMARY OF UNCERTAINTY OF PARAMETERS

Parameter	Population/Sub-population	Range	Midpoint	Value Used	Rationale/ Source
ALL INTAKE EQUATIONS					
Body Weight (kg)	All adults	57.7-101.7	79.7	70	U.S. EPA, 1990b
Body Weight (kg)	All children	8.7-30.0	19.4	15.1	U.S. EPA, 1990b
Exposure Duration (Years)	Occupational population	Unknown	Unknown	47	Maximum duration of career (ages 18-65)
Exposure Duration (Years)	Residential & recreational child	Unknown	Unknown	6	Corresponds to soil ingestion rate time (U.S. EPA,1990b)
Exposure Duration (Years)	Residential & recreational adult	Unknown	Unknown	30	Standard assumption (U.S. EPA, 1989a)
For non-carcinogens:					
Averaging Time (Days)	Occupational population	Unknown	Unknown	17155	47 years exposure
Averaging Time (Days)	Residential & recreational adult	Unknown	Unknown	10950	Standard assumption, 30 years exposure (U.S. EPA, 1990b)
Averaging Time (Days)	Residential & recreational child	Unknown	Unknown	2190	Standard assumption, 6 years exposure
For carcinogens:					
Averaging Time (Days)	All populations	Unknown	Unknown	25550	Standard assumption, 70 year exposure (U.S. EPA, 1989a)
SOIL INGESTION (Equation 1)					
Soil Concentration (mg/kg)	All populations	Table 2-16	NA	Table 3-6	Upper 95% confidence level of the arithmetic mean
Ingestion Rate (mg soil/day)	Occupational population	Unknown	Unknown	50	U.S. EPA, 1990b
Ingestion Rate (mg soil/day)	Residential child	Unknown	Unknown	200	U.S. EPA, 1989a
Ingestion Rate (mg soil/day)	Residential adult	Unknown	Unknown	100	U.S. EPA, 1989a
Ingestion Rate (mg soil/day)	Recreational child	Unknown	Unknown	12.5	Best professional judgement explained in Section 3.6.1
Ingestion Rate (mg soil/day)	Recreational adult	Unknown	Unknown	6.3	Best professional judgement explained in Section 3.6.1
Fraction Ingested at Site	All populations	Unknown	Unknown	100%	Best professional judgement
Exposure Frequency (Days/Year)	Occupational population	Unknown	Unknown	250	Work Days/Year (U.S. EPA, 1990b)
Exposure Frequency (Days/Year)	Residential/recreational populations	Unknown	Unknown	365	Days/Year (U.S. EPA, 1990b)
SOIL DERMAL CONTACT (Equation 2)					
Soil Concentration (mg/kg)	All populations	Table 2-16	NA	Table 3-6	Upper 95% confidence level of the arithmetic mean
Skin Surface Area (cm^2/Event)	Occupational population	Unknown	Unknown	3120	Surface area of adult arms and hands (U.S. EPA, 1989a)
Skin Surface Area (cm^2/Event)	Residential & recreational child	Unknown	Unknown	3535	Ohio EPA, 1991
Skin Surface Area (cm^2/Event)	Residential & recreational adult	Unknown	Unknown	8620	Ohio EPA, 1991
Soil Adherance Rate (mg/cm^2)	All populations	1.45-2.77	2.11	2.11	Ohio EPA, 1991
Absorption Factors:					
Volatile organics	All populations	Unknown	Unknown	25%	Ryan et al., 1987
Semi-volatile organics	All populations	Unknown	Unknown	10%	Ryan et al., 1987
Inorganics	All populations	Unknown	Unknown	1%	Ryan et al., 1987
Exposure Frequency (Days/Year)	Occupational population	Unknown	Unknown	250	Work Days/Year (U.S. EPA, 1990b)
Exposure Frequency (Days/Year)	Residential/recreational populations	Unknown	Unknown	365	Days/Year (U.S. EPA, 1990b)

TABLE 3-53
SUMMARY OF UNCERTAINTY OF PARAMETERS

Parameter	Population/Sub-population	Range	Midpoint	Value Used	Rationale/ Source
GROUND WATER INGESTION (Equation 3)					
Ground Water Concentration (mg/l)	All populations	Table 2-16	NA	Table 3-7	Maximum Concentration
Ingestion Rate (Liters/Day)	Occupational population	Unknown	Unknown	1	U.S. EPA, 1990b
Ingestion Rate (Liters/Day)	Residential child	Unknown	Unknown	1	U.S. EPA, 1989c
Ingestion Rate (Liters/Day)	Residential adult	Unknown	Unknown	2	U.S. EPA, 1990b
Exposure Frequency (Days/Year)	Occupational population	Unknown	Unknown	250	Work Days/Year (U.S. EPA, 1990b)
Exposure Frequency (Days/Year)	Residential populations	Unknown	Unknown	365	Days/Year (U.S. EPA, 1990b)
GROUND WATER - DERMAL CONTACT VIA SHOWERING (Equation 4)					
Ground Water Concentration (mg/l)	Residential populations	Table 2-16	NA	Table 3-7	Maximum Concentration
Skin Surface Area (cm^2)	Residential child	Unknown	Unknown	7280	Surface area of 3-6 year old males (U.S. EPA, 1989a)
Skin Surface Area (cm^2)	Residential adult	Unknown	Unknown	19400	Surface area of adult males (U.S. EPA, 1989a)
Dermal permeability constant (cm/hr):					
Benzene	All populations	Unknown	Unknown	0.111	Blank and McAuliffe (1985); U.S. EPA, 1991
2-Butanone	All populations	Unknown	Unknown	0.005	Blank, et al. (1967); U.S. EPA, 1991
Chromium	All populations	Unknown	Unknown	0.0021	Baranowska-Dutkiewicz (1981); U.S. EPA, 1991
Ethylbenzene	All populations	Unknown	Unknown	0.1	U.S. EPA, 1991
Hexachlorobenzene	All populations	Unknown	Unknown	0.00016	U.S. EPA, 1991
Toluene	All populations	Unknown	Unknown	1.01	Baranowska-Dutkiewicz (1982); U.S. EPA, 1991
Xylene	All populations	Unknown	Unknown	0.1	U.S. EPA, 1991
Volatile organics	All populations	Unknown	Unknown	1.01	U.S. EPA, 1991
Inorganics & semi-volatile organics	All populations	Unknown	Unknown	0.0015	U.S. EPA, 1991
Exposure Time (hours/event)	Residential populations	Unknown	Unknown	0.2	U.S. EPA, 1989a
Exposure Frequency (days/year)	Residential populations	Unknown	Unknown	365	U.S. EPA, 1989c
GROUND WATER - INHALATION VIA SHOWERING (Equation 5)					
Air Concentration (mg/m3)	Residential populations	NA	NA	Table 3-7	Modeled based on maximum ground water concentration
Fraction Respirable	Residential populations	Unknown	Unknown	100%	Best professional judgement
Inhalation Rate (m3/hour)	Residential populations	Unknown	Unknown	0.6	U.S. EPA, 1989a
Exposure Time (hours/event)	Residential populations	Unknown	Unknown	0.37	Assoc. Ground Water Scientists & Engineers, 1989
Exposure Frequency (days/year)	Residential populations	Unknown	Unknown	365	U.S. EPA, 1989c
SURFACE WATER INGESTION (Equation 6)					
Surface Water Concentration (mg/l)					
Current	Residential & recreational populations	Table 2-16	NA	Table 3-8	Upper 95% confidence level of the arithmetic mean
Future	Residential & recreational populations	NA	NA	Table 3-8	Modeled (Appendix D)
Contact Rate (Liters/Hour)	Residential & recreational populations	Unknown	Unknown	0.05	U.S. EPA, 1988a
Exposure Time (Hours/Event)	Residential & recreational populations	Unknown	Unknown	2.6	U.S. EPA, 1988a
Exposure Frequency (Days/Year)	Residential & recreational populations	0-25	12.5	7	U.S. EPA, 1989a

TABLE 3-53
SUMMARY OF UNCERTAINTY OF PARAMETERS

Parameter	Population/Sub-population	Range	Midpoint	Value Used	Rationale/ Source
SURFACE WATER DERMAL CONTACT (Equation 4)					
Surface Water Concentration (mg/l)					
Current	Residential & recreational populations	Table 2-16	NA	Table 3-8	Upper 95% confidence level of the arithmetic mean
Future	Residential & recreational populations	NA	NA	Table 3-8	Modeled (Appendix D)
Skin Surface Area (cm^2)	Residential & recreational child	Unknown	Unknown	7,280	Surface area of 3-6 year old males (U.S. EPA, 1989a)
Skin Surface Area (cm^2)	Residential & recreational adult	Unknown	Unknown	19,400	Surface area of adult males (U.S. EPA, 1989a)
Dermal permeability constant (cm/hr):					
Benzene	All populations	Unknown	Unknown	0.111	Blank and McAuliffe (1985); U.S. EPA, 1991
2-Butanone	All populations	Unknown	Unknown	0.005	Blank, et al. (1967); U.S. EPA, 1991
Chromium	All populations	Unknown	Unknown	0.0021	Baranowska-Dutkiewicz (1981); U.S. EPA, 1991
Ethylbenzene	All populations	Unknown	Unknown	0.1	U.S. EPA, 1991
Hexachlorobenzene	All populations	Unknown	Unknown	0.00016	U.S. EPA, 1991
Toluene	All populations	Unknown	Unknown	1.01	Baranowska-Dutkiewicz (1982); U.S. EPA, 1991
Xylene	All populations	Unknown	Unknown	0.1	U.S. EPA, 1991
Volatile organics	All populations	Unknown	Unknown	1.01	U.S. EPA, 1991
Inorganics & semi-volatile organics	All populations	Unknown	Unknown	0.0015	U.S. EPA, 1991
Exposure Time (Hours/Event)	Residential & recreational populations	Unknown	Unknown	2.6	U.S. EPA, 1988a
Exposure Frequency (Days/Year)	Residential & recreational populations	0-25	12.5	7	U.S. EPA, 1989a
SEDIMENT INGESTION (Equation 1)					
Sediment Concentration (mg/kg)	Residential & recreational populations	Table 2-16	NA	Table 3-9	Upper 95% confidence level of the arithmetic mean
Ingestion Rate (mg Soil/Day)	Residential & recreational child	Unknown	Unknown	22	Best professional judgement explained in Section 3.6.4
Ingestion Rate (mg Soil/Day)	Residential & recreational adult	Unknown	Unknown	11	Best professional judgement explained in Section 3.6.4
Fraction Ingested at Site	All populations	Unknown	Unknown	100%	Best professional judgement
Exposure Frequency (Days/Year)	Residential & recreational populations	0-25	12.5	7	U.S. EPA, 1989a
SEDIMENT DERMAL CONTACT (Equation 2)					
Sediment Concentration (mg/kg)	Residential & recreational populations	Table 2-16	NA	Table 3-9	Upper 95% confidence level of the arithmetic mean
Skin Surface Area (cm^2/Event)	Residential & Recreational child	Unknown	Unknown	3535	Ohio EPA, 1991
Skin Surface Area (cm^2/Event)	Residential & Recreational adult	Unknown	Unknown	8620	Ohio EPA, 1991
Soil Adherance Rate (mg/cm^2)	All populations	1.45-2.77	2.11	2.11	Ohio EPA, 1991
Absorption Factors:					
Volatile organics	Residential & recreational populations	Unknown	Unknown	25%	Ryan et al., 1987
Semi-volatile organics	Residential & recreational populations	Unknown	Unknown	10%	Ryan et al., 1987
Inorganics	Residential & recreational populations	Unknown	Unknown	1%	Ryan et al., 1987
Exposure Frequency (Days/Year)	Residential & recreational populations	0-25	12.5	7	U.S. EPA, 1989a

NA = not applicable

TABLE 3-47
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	1.2 E-3	1.3 E-4	1.2 E-3	1.3 E-4
Barium	ne	nd	nd	nd	nd
Beryllium	ne	6.4 E-8	6.9 E-9	6.4 E-8	6.9 E-9
Chromium	ne	1.3 E-6	1.4 E-7	1.3 E-6	1.4 E-7
Cobalt	ne	6.0 E-7	6.5 E-8	6.0 E-7	6.5 E-8
Copper	ne	6.3 E-7	6.8 E-8	6.3 E-7	6.8 E-8
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	1.1 E-6	1.2 E-7	1.1 E-6	1.2 E-7
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	2.0 E-6	2.2 E-7	2.0 E-6	2.2 E-7
Zinc	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-47
ESTIMATED NON-CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	6.5 E-9	7.0 E-10	6.5 E-9	7.0 E-10
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	4.8 E-11	5.1 E-12	4.8 E-11	5.1 E-12
Chlordene	ne	nd	nd	nd	nd

ne = no exposure

nd = not detected or not calculated

TABLE 3-48
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	2.4 E-3	1.2 E-3	2.4 E-3	1.2 E-3	ne	1.4 E-3	7.6 E-4	1.4 E-3	7.6 E-4
Barium	ne	2.0 E-5	1.0 E-5	2.0 E-5	1.0 E-5	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	2.8 E-6	1.5 E-6	2.8 E-6	1.5 E-6	ne	2.5 E-6	1.3 E-6	2.5 E-6	1.3 E-6
Cobalt	ne	1.8 E-6	9.3 E-7	1.8 E-6	9.3 E-7	ne	nd	nd	nd	nd
Copper	ne	2.8 E-6	1.5 E-6	2.8 E-6	1.5 E-6	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	4.8 E-5	2.5 E-5	4.8 E-5	2.5 E-5
Mercury	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	2.3 E-6	1.2 E-6	2.3 E-6	1.2 E-6	ne	nd	nd	nd	nd
Thallium	ne	5.8 E-8	3.0 E-8	5.8 E-8	3.0 E-8	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	4.5 E-6	2.3 E-6	4.5 E-6	2.3 E-6
Vanadium	ne	5.2 E-6	2.7 E-6	5.2 E-6	2.7 E-6	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	1.2 E-5	6.5 E-6	1.2 E-5	6.5 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	7.1 E-8	3.7 E-8	7.1 E-8	3.7 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	2.6 E-8	1.4 E-8	2.6 E-8	1.4 E-8
Trichloroethene	ne	nd	nd	nd	nd	ne	3.8 E-9	2.0 E-9	3.8 E-9	2.0 E-9
Benzene	ne	nd	nd	nd	nd	ne	9.5 E-8	5.0 E-8	9.5 E-8	5.0 E-8
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	1.8 E-7	9.2 E-8	1.8 E-7	9.2 E-8
Xylene (total)	ne	nd	nd	nd	nd	ne	6.2 E-7	3.3 E-7	6.2 E-7	3.3 E-7
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	4.6 E-7	2.4 E-7	4.6 E-7	2.4 E-7
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	1.5 E-7	8.0 E-8	1.5 E-7	8.0 E-8

TABLE 3-48
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8
Phenanthrene	ne	nd	nd	nd	nd	ne	5.6 E-7	2.9 E-7	5.6 E-7	2.9 E-7
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8
Pyrene	ne	nd	nd	nd	nd	ne	4.8 E-7	2.5 E-7	4.8 E-7	2.5 E-7
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	9.5 E-8	5.0 E-8	9.5 E-8	5.0 E-8
Chrysene	ne	nd	nd	nd	nd	ne	1.3 E-7	7.0 E-8	1.3 E-7	7.0 E-8
bis(2-Ethylhexyl)Phthalate	ne	7.6 E-8	4.0 E-8	7.6 E-8	4.0 E-8	ne	1.3 E-7	6.7 E-8	1.3 E-7	6.7 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	1.5 E-7	8.0 E-8	1.5 E-7	8.0 E-8
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.7 E-7	1.4 E-7	2.7 E-7	1.4 E-7
Aroclor-1260	ne	nd	nd	nd	nd	ne	4.2 E-7	2.2 E-7	4.2 E-7	2.2 E-7
Hexachlorobenzene	ne	3.0 E-9	1.6 E-9	3.0 E-9	1.6 E-9	ne	6.8 E-9	3.6 E-9	6.8 E-9	3.6 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	3.2 E-9	1.7 E-9	3.2 E-9	1.7 E-9
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	2.4 E-9	1.2 E-9	2.4 E-9	1.2 E-9	ne	3.5 E-9	1.8 E-9	3.5 E-9	1.8 E-9
Chlordene	ne	1.5 E-9	8.0 E-10	1.5 E-9	8.0 E-10	ne	nd	nd	nd	nd

ne = no exposure nd = not detected or not calculated

TABLE 3-48
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	4.0 E-3	2.1 E-3	4.0 E-3	2.1 E-3
Barium	ne	nd	nd	nd	nd
Beryllium	ne	2.2 E-7	1.1 E-7	2.2 E-7	1.1 E-7
Chromium	ne	4.4 E-6	2.3 E-6	4.4 E-6	2.3 E-6
Cobalt	ne	2.0 E-6	1.1 E-6	2.0 E-6	1.1 E-6
Copper	ne	2.2 E-6	1.1 E-6	2.2 E-6	1.1 E-6
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	3.7 E-6	2.0 E-6	3.7 E-6	2.0 E-6
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	6.9 E-6	3.7 E-6	6.9 E-6	3.7 E-6
Zinc	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-50
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	1.0 E-4	5.5 E-5	1.0 E-4	5.5 E-5
Barium	ne	nd	nd	nd	nd
Beryllium	ne	5.5 E-9	3.0 E-9	5.5 E-9	3.0 E-9
Chromium	ne	1.1 E-7	6.0 E-8	1.1 E-7	6.0 E-8
Cobalt	ne	5.2 E-8	2.8 E-8	5.2 E-8	2.8 E-8
Copper	ne	5.4 E-8	2.9 E-8	5.4 E-8	2.9 E-8
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	9.4 E-8	5.1 E-8	9.4 E-8	5.1 E-8
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	1.8 E-7	9.5 E-8	1.8 E-7	9.5 E-8
Zinc	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-48
ESTIMATED NON-CARCINOGENIC INTAKE FROM DERMAL CONTACT OF POND SEDIMENT
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	2.2 E-7	1.2 E-7	2.2 E-7	1.2 E-7
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	1.6 E-9	8.5 E-10	1.6 E-9	8.5 E-10
Chlordene	ne	nd	nd	nd	nd

ne = no exposure

nd = not detected or not calculated

TABLE 3-49
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	3.1 E-3	1.3 E-3	3.1 E-3	1.3 E-3	ne	1.9 E-3	8.1 E-4	1.9 E-3	8.1 E-4
Barium	ne	2.6 E-5	1.1 E-5	2.6 E-5	1.1 E-5	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	3.6 E-6	1.6 E-6	3.6 E-6	1.6 E-6	ne	3.3 E-6	1.4 E-6	3.3 E-6	1.4 E-6
Cobalt	ne	2.3 E-6	9.9 E-7	2.3 E-6	9.9 E-7	ne	nd	nd	nd	nd
Copper	ne	3.6 E-6	1.5 E-6	3.6 E-6	1.5 E-6	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	6.3 E-5	2.7 E-5	6.3 E-5	2.7 E-5
Mercury	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	2.9 E-6	1.3 E-6	2.9 E-6	1.3 E-6	ne	nd	nd	nd	nd
Thallium	ne	7.5 E-8	3.2 E-8	7.5 E-8	3.2 E-8	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	5.8 E-6	2.5 E-6	5.8 E-6	2.5 E-6
Vanadium	ne	6.7 E-6	2.9 E-6	6.7 E-6	2.9 E-6	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	1.6 E-5	6.9 E-6	1.6 E-5	6.9 E-6
Methylene Chloride	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	7.2 E-8	3.7 E-8	7.2 E-8	3.7 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	2.6 E-8	1.4 E-8	2.6 E-8	1.4 E-8
Trichloroethene	ne	nd	nd	nd	nd	ne	3.8 E-9	2.0 E-9	3.8 E-9	2.0 E-9
Benzene	ne	nd	nd	nd	nd	ne	9.7 E-8	5.0 E-8	9.7 E-8	5.0 E-8
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	1.8 E-7	9.2 E-8	1.8 E-7	9.2 E-8
Xylene (total)	ne	nd	nd	nd	nd	ne	6.3 E-7	3.3 E-7	6.3 E-7	3.3 E-7
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	4.8 E-7	2.5 E-7	4.8 E-7	2.5 E-7
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	1.6 E-7	8.0 E-8	1.6 E-7	8.0 E-8

TABLE 3-49
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8
Phenanthrene	ne	nd	nd	nd	nd	ne	5.8 E-7	3.0 E-7	5.8 E-7	3.0 E-7
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8
Pyrene	ne	nd	nd	nd	nd	ne	5.0 E-7	2.6 E-7	5.0 E-7	2.6 E-7
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	9.8 E-8	5.0 E-8	9.8 E-8	5.0 E-8
Chrysene	ne	nd	nd	nd	nd	ne	1.4 E-7	7.0 E-8	1.4 E-7	7.0 E-8
bis(2-Ethylhexyl)Phthalate	ne	7.8 E-8	4.0 E-8	7.8 E-8	4.0 E-8	ne	1.3 E-7	6.7 E-8	1.3 E-7	6.7 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	1.6 E-7	8.0 E-8	1.6 E-7	8.0 E-8
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.8 E-7	1.5 E-7	2.8 E-7	1.5 E-7
Aroclor-1260	ne	nd	nd	nd	nd	ne	4.3 E-7	2.2 E-7	4.3 E-7	2.2 E-7
Hexachlorobenzene	ne	3.1 E-9	1.6 E-9	3.1 E-9	1.6 E-9	ne	7.0 E-9	3.6 E-9	7.0 E-9	3.6 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	3.3 E-9	1.7 E-9	3.3 E-9	1.7 E-9
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	2.4 E-9	1.3 E-9	2.4 E-9	1.3 E-9	ne	3.6 E-9	1.9 E-9	3.6 E-9	1.9 E-9
Chlordene	ne	1.6 E-9	8.1 E-10	1.6 E-9	8.1 E-10	ne	nd	nd	nd	nd

ne = no exposure   nd = not detected or not calculated

TABLE 3-49
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	5.2 E-3	2.3 E-3	5.2 E-3	2.3 E-3
Barium	ne	nd	nd	nd	nd
Beryllium	ne	2.8 E-7	1.2 E-7	2.8 E-7	1.2 E-7
Chromium	ne	5.7 E-6	2.5 E-6	5.7 E-6	2.5 E-6
Cobalt	ne	2.6 E-6	1.1 E-6	2.6 E-6	1.1 E-6
Copper	ne	2.8 E-6	1.2 E-6	2.8 E-6	1.2 E-6
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	4.8 E-6	2.1 E-6	4.8 E-6	2.1 E-6
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	9.0 E-6	3.9 E-6	9.0 E-6	3.9 E-6
Zinc	ne	nd	nd	nd	nd
Methylene Chloride	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-49
ESTIMATED TOTAL NON-CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	2.3 E-7	1.2 E-7	2.3 E-7	1.2 E-7
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	1.7 E-9	8.5 E-10	1.7 E-9	8.5 E-10
Chlordene	ne	nd	nd	nd	nd

ne = no exposure

nd = not detected or not calculated

TABLE 3-50
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	6.0 E-5	3.2 E-5	6.0 E-5	3.2 E-5	ne	3.7 E-5	2.0 E-5	3.7 E-5	2.0 E-5
Barium	ne	5.0 E-7	2.7 E-7	5.0 E-7	2.7 E-7	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	7.1 E-8	3.8 E-8	7.1 E-8	3.8 E-8	ne	6.4 E-8	3.5 E-8	6.4 E-8	3.5 E-8
Cobalt	ne	4.5 E-8	2.4 E-8	4.5 E-8	2.4 E-8	ne	nd	nd	nd	nd
Copper	ne	7.0 E-8	3.8 E-8	7.0 E-8	3.8 E-8	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	1.2 E-6	6.6 E-7	1.2 E-6	6.6 E-7
Mercury	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	5.7 E-8	3.1 E-8	5.7 E-8	3.1 E-8	ne	nd	nd	nd	nd
Thallium	ne	1.5 E-9	7.9 E-10	1.5 E-9	7.9 E-10	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	1.1 E-7	6.1 E-8	1.1 E-7	6.1 E-8
Vanadium	ne	1.3 E-7	7.1 E-8	1.3 E-7	7.1 E-8	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	3.1 E-7	1.7 E-7	3.1 E-7	1.7 E-7
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	7.2 E-11	3.9 E-11	7.2 E-11	3.9 E-11
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	2.6 E-11	1.4 E-11	2.6 E-11	1.4 E-11
Trichloroethene	ne	nd	nd	nd	nd	ne	3.8 E-12	2.1 E-12	3.8 E-12	2.1 E-12
Benzene	ne	nd	nd	nd	nd	ne	9.7 E-11	5.2 E-11	9.7 E-11	5.2 E-11
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	1.8 E-10	9.6 E-11	1.8 E-10	9.6 E-11
Xylene (total)	ne	nd	nd	nd	nd	ne	6.3 E-10	3.4 E-10	6.3 E-10	3.4 E-10
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	1.2 E-9	6.3 E-10	1.2 E-9	6.3 E-10
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	3.8 E-10	2.1 E-10	3.8 E-10	2.1 E-10

TABLE 3-50
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10
Phenanthrene	ne	nd	nd	nd	nd	ne	1.4 E-9	7.6 E-10	1.4 E-9	7.6 E-10
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10
Pyrene	ne	nd	nd	nd	nd	ne	1.2 E-9	6.6 E-10	1.2 E-9	6.6 E-10
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	2.4 E-10	1.3 E-10	2.4 E-10	1.3 E-10
Chrysene	ne	nd	nd	nd	nd	ne	3.4 E-10	1.8 E-10	3.4 E-10	1.8 E-10
bis(2-Ethylhexyl)Phthalate	ne	1.9 E-10	1.0 E-10	1.9 E-10	1.0 E-10	ne	3.2 E-10	1.7 E-10	3.2 E-10	1.7 E-10
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	3.8 E-10	2.1 E-10	3.8 E-10	2.1 E-10
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	6.9 E-10	3.7 E-10	6.9 E-10	3.7 E-10
Aroclor-1260	ne	nd	nd	nd	nd	ne	1.1 E-9	5.7 E-10	1.1 E-9	5.7 E-10
Hexachlorobenzene	ne	7.7 E-12	4.1 E-12	7.7 E-12	4.1 E-12	ne	1.7 E-11	9.3 E-12	1.7 E-11	9.3 E-12
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	8.1 E-12	4.4 E-12	8.1 E-12	4.4 E-12
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	6.0 E-12	3.2 E-12	6.0 E-12	3.2 E-12	ne	8.9 E-12	4.8 E-12	8.9 E-12	4.8 E-12
Chlordene	ne	3.9 E-12	2.1 E-12	3.9 E-12	2.1 E-12	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-51
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	2.0 E-4	5.3 E-4	2.0 E-4	5.3 E-4	ne	1.2 E-4	3.3 E-4	1.2 E-4	3.3 E-4
Barium	ne	1.7 E-6	4.5 E-6	1.7 E-6	4.5 E-6	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	2.4 E-7	6.3 E-7	2.4 E-7	6.3 E-7	ne	2.2 E-7	5.7 E-7	2.2 E-7	5.7 E-7
Cobalt	ne	1.5 E-7	4.0 E-7	1.5 E-7	4.0 E-7	ne	nd	nd	nd	nd
Copper	ne	2.4 E-7	6.3 E-7	2.4 E-7	6.3 E-7	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	4.1 E-6	1.1 E-5	4.1 E-6	1.1 E-5
Mercury	ne.	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	1.9 E-7	5.1 E-7	1.9 E-7	5.1 E-7	ne	nd	nd	nd	nd
Thallium	ne	5.0 E-9	1.3 E-8	5.0 E-9	1.3 E-8	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	3.8 E-7	1.0 E-6	3.8 E-7	1.0 E-6
Vanadium	ne	4.4 E-7	1.2 E-6	4.4 E-7	1.2 E-6	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	1.1 E-6	2.8 E-6	1.1 E-6	2.8 E-6
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	6.1 E-9	1.6 E-8	6.1 E-9	1.6 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	2.2 E-9	5.9 E-9	2.2 E-9	5.9 E-9
Trichloroethene	ne	nd	nd	nd	nd	ne	3.2 E-10	8.5 E-10	3.2 E-10	8.5 E-10
Benzene	ne	nd	nd	nd	nd	ne	8.2 E-9	2.2 E-8	8.2 E-9	2.2 E-8
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	1.5 E-8	4.0 E-8	1.5 E-8	4.0 E-8
Xylene (total)	ne	nd	nd	nd	nd	ne	5.3 E-8	1.4 E-7	5.3 E-8	1.4 E-7
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	4.0 E-8	1.0 E-7	4.0 E-8	1.0 E-7
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8

TABLE 3-51
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8
Phenanthrene	ne	nd	nd	nd	nd	ne	4.8 E-8	1.3 E-7	4.8 E-8	1.3 E-7
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8
Pyrene	ne	nd	nd	nd	nd	ne	4.1 E-8	1.1 E-7	4.1 E-8	1.1 E-7
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	8.1 E-9	2.1 E-8	8.1 E-9	2.1 E-8
Chrysene	ne	nd	nd	nd	nd	ne	1.1 E-8	3.0 E-8	1.1 E-8	3.0 E-8
bis(2-Ethylhexyl)Phthalate	ne	6.5 E-9	1.7 E-8	6.5 E-9	1.7 E-8	ne	1.1 E-8	2.9 E-8	1.1 E-8	2.9 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.4 E-8	6.2 E-8	2.4 E-8	6.2 E-8
Aroclor-1260	ne	nd	nd	nd	nd	ne	3.6 E-8	9.4 E-8	3.6 E-8	9.4 E-8
Hexachlorobenzene	ne	2.6 E-10	6.8 E-10	2.6 E-10	6.8 E-10	ne	5.8 E-10	1.5 E-9	5.8 E-10	1.5 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	2.8 E-10	7.3 E-10	2.8 E-10	7.3 E-10
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	2.0 E-10	5.3 E-10	2.0 E-10	5.3 E-10	ne	3.0 E-10	7.9 E-10	3.0 E-10	7.9 E-10
Chlordene	ne	1.3 E-10	3.4 E-10	1.3 E-10	3.4 E-10	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-51
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	3.5 E-4	9.1 E-4	3.5 E-4	9.1 E-4
Barium	ne	nd	nd	nd	nd
Beryllium	ne	1.9 E-8	4.9 E-8	1.9 E-8	4.9 E-8
Chromium	ne	3.8 E-7	9.9 E-7	3.8 E-7	9.9 E-7
Cobalt	ne	1.8 E-7	4.6 E-7	1.8 E-7	4.6 E-7
Copper	ne	1.8 E-7	4.8 E-7	1.8 E-7	4.8 E-7
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	3.2 E-7	8.4 E-7	3.2 E-7	8.4 E-7
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	6.0 E-7	1.6 E-6	6.0 E-7	1.6 E-6
Zinc	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-51
ESTIMATED CARCINOGENIC INTAKE FROM DERMAL CONTACT WITH POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.9 E-8	4.9 E-8	1.9 E-8	4.9 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	1.4 E-10	3.6 E-10	1.4 E-10	3.6 E-10
Chlordene	ne	nd	nd	nd	nd

nd = not detected or not calculated ne = no exposure

TABLE 3-52
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Aluminum	ne	2.6 E-4	5.6 E-4	2.6 E-4	5.6 E-4	ne	1.6 E-4	3.5 E-4	1.6 E-4	3.5 E-4
Barium	ne	2.2 E-6	4.7 E-6	2.2 E-6	4.7 E-6	ne	nd	nd	nd	nd
Beryllium	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Chromium	ne	3.1 E-7	6.7 E-7	3.1 E-7	6.7 E-7	ne	2.8 E-7	6.1 E-7	2.8 E-7	6.1 E-7
Cobalt	ne	2.0 E-7	4.2 E-7	2.0 E-7	4.2 E-7	ne	nd	nd	nd	nd
Copper	ne	3.1 E-7	6.6 E-7	3.1 E-7	6.6 E-7	ne	nd	nd	nd	nd
Lead	ne	nd	nd	nd	nd	ne	5.4 E-6	1.2 E-5	5.4 E-6	1.2 E-5
Mercury	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nickel	ne	2.5 E-7	5.4 E-7	2.5 E-7	5.4 E-7	ne	nd	nd	nd	nd
Thallium	ne	6.4 E-9	1.4 E-8	6.4 E-9	1.4 E-8	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd	ne	4.9 E-7	1.1 E-6	4.9 E-7	1.1 E-6
Vanadium	ne	5.7 E-7	1.2 E-6	5.7 E-7	1.2 E-6	ne	nd	nd	nd	nd
Zinc	ne	nd	nd	nd	nd	ne	1.4 E-6	3.0 E-6	1.4 E-6	3.0 E-6
Acetone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd	ne	6.1 E-9	1.6 E-8	6.1 E-9	1.6 E-8
1,2-Dichloroethene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd	ne	2.3 E-9	5.9 E-9	2.3 E-9	5.9 E-9
Trichloroethene	ne	nd	nd	nd	nd	ne	3.3 E-10	8.6 E-10	3.3 E-10	8.6 E-10
Benzene	ne	nd	nd	nd	nd	ne	8.3 E-9	2.2 E-8	8.3 E-9	2.2 E-8
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd	ne	1.5 E-8	4.0 E-8	1.5 E-8	4.0 E-8
Xylene (total)	ne	nd	nd	nd	nd	ne	5.4 E-8	1.4 E-7	5.4 E-8	1.4 E-7
Phenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8
2-Methylnaphthalene	ne	nd	nd	nd	nd	ne	4.1 E-8	1.1 E-7	4.1 E-8	1.1 E-7
Acenaphthylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8

TABLE 3-52
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Duck Pond - Current & Future					Diving Pond - Current & Future				
	Occupational	Residential		Recreational		Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8
Phenanthrene	ne	nd	nd	nd	nd	ne	4.9 E-8	1.3 E-7	4.9 E-8	1.3 E-7
Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8
Pyrene	ne	nd	nd	nd	nd	ne	4.3 E-8	1.1 E-7	4.3 E-8	1.1 E-7
Benzo(a)Anthracene	ne	nd	nd	nd	nd	ne	8.4 E-9	2.1 E-8	8.4 E-9	2.1 E-8
Chrysene	ne	nd	nd	nd	nd	ne	1.2 E-8	3.0 E-8	1.2 E-8	3.0 E-8
bis(2-Ethylhexyl)Phthalate	ne	6.7 E-9	1.7 E-8	6.7 E-9	1.7 E-8	ne	1.1 E-8	2.9 E-8	1.1 E-8	2.9 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd	ne	1.3 E-8	3.4 E-8	1.3 E-8	3.4 E-8
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd	ne	2.4 E-8	6.2 E-8	2.4 E-8	6.2 E-8
Aroclor-1260	ne	nd	nd	nd	nd	ne	3.7 E-8	9.5 E-8	3.7 E-8	9.5 E-8
Hexachlorobenzene	ne	2.7 E-10	6.9 E-10	2.7 E-10	6.9 E-10	ne	6.0 E-10	1.5 E-9	6.0 E-10	1.5 E-9
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd	ne	2.8 E-10	7.3 E-10	2.8 E-10	7.3 E-10
Octachlorocyclopentene	ne	nd	nd	nd	nd	ne	nd	nd	nd	nd
Heptachloronorborene	ne	2.1 E-10	5.4 E-10	2.1 E-10	5.4 E-10	ne	3.1 E-10	7.9 E-10	3.1 E-10	7.9 E-10
Chlordene	ne	1.3 E-10	3.5 E-10	1.3 E-10	3.5 E-10	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-52
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Aluminum	ne	4.5 E-4	9.7 E-4	4.5 E-4	9.7 E-4
Barium	ne	nd	nd	nd	nd
Beryllium	ne	2.4 E-8	5.2 E-8	2.4 E-8	5.2 E-8
Chromium	ne	4.9 E-7	1.1 E-6	4.9 E-7	1.1 E-6
Cobalt	ne	2.3 E-7	4.9 E-7	2.3 E-7	4.9 E-7
Copper	ne	2.4 E-7	5.1 E-7	2.4 E-7	5.1 E-7
Lead	ne	nd	nd	nd	nd
Mercury	ne	nd	nd	nd	nd
Nickel	ne	4.1 E-7	8.9 E-7	4.1 E-7	8.9 E-7
Thallium	ne	nd	nd	nd	nd
Tin	ne	nd	nd	nd	nd
Vanadium	ne	7.7 E-7	1.7 E-6	7.7 E-7	1.7 E-6
Zinc	ne	nd	nd	nd	nd
Acetone	ne	nd	nd	nd	nd
Carbon Disulfide	ne	nd	nd	nd	nd
1,1-Dichloroethene	ne	nd	nd	nd	nd
1,2-Dichloroethene	ne	nd	nd	nd	nd
2-Butanone	ne	nd	nd	nd	nd
Trichloroethene	ne	nd	nd	nd	nd
Benzene	ne	nd	nd	nd	nd
4-Methyl-2-Pentanone	ne	nd	nd	nd	nd
2-Hexanone	ne	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	ne	nd	nd	nd	nd
Ethylbenzene	ne	nd	nd	nd	nd
Xylene (total)	ne	nd	nd	nd	nd
Phenol	ne	nd	nd	nd	nd
4-Methylphenol	ne	nd	nd	nd	nd
Nitrobenzene	ne	nd	nd	nd	nd
Naphthalene	ne	nd	nd	nd	nd
2-Methylnaphthalene	ne	nd	nd	nd	nd
Acenaphthylene	ne	nd	nd	nd	nd
Acenaphthene	ne	nd	nd	nd	nd

TABLE 3-50
ESTIMATED CARCINOGENIC INTAKE FROM INGESTION OF POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	5.5 E-10	3.0 E-10	5.5 E-10	3.0 E-10
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	4.1 E-12	2.2 E-12	4.1 E-12	2.2 E-12
Chlordene	ne	nd	nd	nd	nd

nd = not detected or not calculated   ne = no exposure

TABLE 3-52
ESTIMATED TOTAL CARCINOGENIC INTAKE FROM POND SEDIMENTS
(mg/kg/day)

Chemical	Trilobite Pond - Current & Future				
	Occupational	Residential		Recreational	
	Adult	Child	Adult	Child	Adult
Dibenzofuran	ne	nd	nd	nd	nd
Diethylphthalate	ne	nd	nd	nd	nd
Fluorene	ne	nd	nd	nd	nd
Phenanthrene	ne	nd	nd	nd	nd
Anthracene	ne	nd	nd	nd	nd
Di-n-Butylphthalate	ne	nd	nd	nd	nd
Fluoranthene	ne	nd	nd	nd	nd
Pyrene	ne	nd	nd	nd	nd
Benzo(a)Anthracene	ne	nd	nd	nd	nd
Chrysene	ne	nd	nd	nd	nd
bis(2-Ethylhexyl)Phthalate	ne	1.9 E-8	5.0 E-8	1.9 E-8	5.0 E-8
Benzo(b)Fluoranthene	ne	nd	nd	nd	nd
Benzo(k)Fluoranthene	ne	nd	nd	nd	nd
Benzo(a)Pyrene	ne	nd	nd	nd	nd
Indeno(1,2,3-cd)Pyrene	ne	nd	nd	nd	nd
Dibenzo(a,h)Anthracene	ne	nd	nd	nd	nd
Benzo(g,h,i)Perylene	ne	nd	nd	nd	nd
beta-BHC	ne	nd	nd	nd	nd
4,4'-DDD	ne	nd	nd	nd	nd
alpha-Chlordane	ne	nd	nd	nd	nd
Aroclor-1254	ne	nd	nd	nd	nd
Aroclor-1260	ne	nd	nd	nd	nd
Hexachlorobenzene	ne	nd	nd	nd	nd
Hexachlorocyclopentadiene	ne	nd	nd	nd	nd
Hexachlorobutadiene	ne	nd	nd	nd	nd
Octachlorocyclopentene	ne	nd	nd	nd	nd
Heptachloronorborene	ne	1.4 E-10	3.7 E-10	1.4 E-10	3.7 E-10
Chlordene	ne	nd	nd	nd	nd

nd = not detected or not calculated　　ne = no exposure

4.0 TOXICITY ASSESSMENT

The purpose of the toxicity assessment is to weigh available evidence regarding the potential for particular chemicals to cause adverse effects in exposed individuals and to provide, where possible, an estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects. A toxicity assessment is generally accomplished in two steps: hazard identification and dose-response assessment.

The first step, hazard identification, is the process of determining whether exposure to a chemical can cause an increase in the incidence of a particular adverse health effect (e.g., cancer, birth defect) and whether the adverse health effect is likely to occur in humans. Hazard identification involves characterizing the nature and strength of the evidence of causation. The second step, dose-response evaluation, is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the contaminant administered or received and incidence of adverse health effects in the exposed population. From this quantitative dose-response relationship, toxicity values (reference doses and slope factors) are derived that can be used to estimate the incidence or potential for adverse effects as a function of human exposure to the agent. These toxicity values are used in the risk characterization step to estimate the likelihood of adverse effects occurring in humans at different exposure levels.

Toxicity assessment is an integral part of the risk assessment. The United States Environmental Protection Agency has performed the toxicity assessment step for numerous chemicals and has made available the resulting toxicity information and toxicity values, which have undergone extensive peer review. This information is available from the Integrated Risk Information System (IRIS; U.S. EPA, 1989b), a computerized toxicological data base system, and Health Effects Assessment Summary Tables (HEAST, U.S. EPA, 1990a) which are updated quarterly.

4.1 TOXICITY INFORMATION FOR CARCINOGENIC EFFECTS

Exposure to contaminants may elicit both carcinogenic and non-carcinogenic responses. The carcinogenic response is assumed to be a "non-threshold" effect: any exposure, no matter how small, increases the potential for contracting cancer. Carcinogenic slope factors that estimate the linear slope of the dose-response curve are used to quantify the risk of exposure to potential carcinogens. Some chemicals may elicit both carcinogenic and non-carcinogenic effects; others may elicit either carcinogenic or non-carcinogenic effects. In many instances, as discussed below, there is limited toxicological information available on which to base these determinations. Table 4-1 presents the carcinogenic slope factors for the chemicals of concern. Table 4-2 presents the inhalation slope factors for volatile chemicals of concern which were used in the showering exposure model.

4.2 TOXICITY INFORMATION FOR NON-CARCINOGENIC EFFECTS

For non-carcinogenic effects, protective mechanisms are believed to exist that must be overcome before an adverse effect is manifested. As a result, a range of exposures from zero to some finite value exists that can be tolerated by an organism with essentially no chance of expression of adverse effects. The United States Environmental Protection Agency has developed reference doses (RfD's) for many chemicals. The RfD is an estimate of a daily intake by people (including sensitive subpopulations) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Uncertainties on the estimate may span an order of magnitude.

The RfD's are based on the oral and inhalation routes of exposure. The RfD's established for the oral route are used to evaluate the intakes from ingestion of water, the ingestion of soils, and dermal absorption of contaminants through exposure to contaminated soil or water. The inhalation RfD's are used to evaluate the intakes from inhalation of vapors or particles.

Table 4-3 presents oral reference doses and critical effects for the chemicals of concern. Table 4-2 presents inhalation reference concentrations for volatile chemicals of concern which were used in the showering exposure model.

4.3 CHEMICALS FOR WHICH NO U.S. EPA TOXICITY VALUES ARE AVAILABLE

Toxicity values (slope factors and reference doses) were obtained from the IRIS database, or from HEAST if they were not available in IRIS. The Environmental Criteria and Assessment Office (ECAO) was consulted if toxicity values for a chemical were not available from HEAST or IRIS.

4.3.1 CHEMICALS FOR WHICH NO U.S. EPA ORAL REFERENCE DOSE VALUES ARE AVAILABLE

Oral reference doses were not available for some contaminants present at the Skinner site. The reference dose for total chlordane was used for alpha-chlordane and gamma-chlordane due to the structural similarity of the chemicals. Two of the chemicals of concern, total chromium and total 1,2-dichloroethene, were evaluated based on the reference dose of the most toxic compound, i.e., chromium VI and cis-1,2-dichloroethene, respectively (ECAO, Appendix H).

The reference dose for napthalene was used for acenaphthylene and benzo (g,h,i)perylene (ECAO, Appendix H). The reference dose for Aroclor-1016 was used for Aroclor-1248, Aroclor-1254, and Aroclor-1260 (ECAO, Appendix E). Oral reference doses were not available from IRIS, HEAST and/or ECAO for the following chemicals:

aluminum
benzene
benzo(a)anthracene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(a)pyrene
bis(2-chloroethyl)ether
chloroethane
chrysene
copper
DDD
DDE
dibenz(a,h)anthracene
1,4-dichlorobenzene
1,2-dichloroethane
endrin ketone
heptachloronorborene
beta-hexachlorocyclohexane
2-hexanone
indeno(1,2,3-cd)pyrene
iron
lead
2-methyl naphthalene
octachlorocyclopentene
sodium
1,1,2,2-tetrachloroethane
vinyl chloride

The U.S. EPA's RfD Work Group considered it inappropriate to develop an RfD for inorganic lead. The health effects of lead exposure are dependent on the concentration of lead to which one is exposed. Health effects that have been attributed to short-term (14 days or less) lead exposure include reduced birth weights, premature birth, decreased mental ability of exposed infants, brain and kidney damage to both adults and children, and death to children. In addition to these health effects, long-term exposure (greater than 14 days) to lead has also been cited as the cause for decreased IQ (intelligence quotient) and growth in young children and increased blood pressure in men. Abortions and male sterility have also been attributed to lead exposure although exposure concentrations have not been well defined. (ATSDR, 1990).

4.3.2 Chemicals for Which No U.S. EPA Oral Slope Factor Values are Available

The slope factor for total Chlordane was used to calculate the risk of alpha-Chlordane and gamma-Chlordane because values specific to alpha-Chlordane and gamma-Chlordane were not available.

The IRIS document for polychlorinated biphenyls (PCBs) establishes a slope factor for PCBs based on an animal study which used Aroclor-1260 as the PCB. This slope factor was used for Aroclor-1260, Aroclor-1254, and Aroclor-1248 (ECAO, Appendix H).

Toxicity equivalency factors were calculated for chlorinated dibenzo-p-dioxins and dibenzofurans and the slope factor for 2,3,7,8-TCDD was used for these chemicals as a group (see Section 3.5.4).

There are no available slope factors for benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene, therefore the slope factor for benzo(a)pyrene was used to calculate the risk from each of these chemicals based on the similarity between chemical structures and properties of the chemicals (ECAO, Appendix H).

U.S. EPA has listed the following chemicals as Group D carcinogens (IRIS, HEAST, and/or ECAO, Appendix H). Group D carcinogens are not classified as to their carcinogenic potential in humans due to the lack of human data and inadequate animal data. Slope factors for these chemicals were not estimated because of this lack of data:

acenaphthylene
acetone
anthracene
benzo(g,h,i)perylene
benzoic acid
2-butanone
chlorobenzene
chloroethane
cis 1,2-dichloroethene
copper
cyanide
dibenzofuran
ethylbenzene
fluoranthene
fluorene
hexachlorocyclopentadiene
manganese
mercury
naphthalene
nitrobenzene
phenanthrene
phenol
pyrene
silver

1,2-dichlorobenzene	thallium
1,3-dichlorobenzene	toluene
diethyl phthalate	1,1,1-trichloroethane
dimethyl phthalate	xylene
di-n-butyl phthalate	zinc
Endrin	

The U.S. EPA has designated butyl benzyl phthalate as a possible human carcinogen (Group C - IRIS) "based on statistically significant increase in mononuclear cell leukemia in female rats; the response in male rats was inconclusive and there was no such response in mice." U.S. EPA has not calculated a slope factor for this chemical.

The U.S. EPA has designated 1,1-dichloroethane as a possible human carcinogen (Group C-IRIS) "based on no human data and limited evidence of carcinogenicity in two animal species (rats and mice) as shown by an increased incidence of mammary glad adenocarcinomas and hemangioscarcomas in female rats and an increased incidence of hepatocellular carcinomas and benign uterine polyps in mice". U.S. EPA has not calculated a slope factor for this chemical.

The U.S. EPA has also designated 2-methylphenol and 4-methylphenol (o-cresol, p-cresol) as possible human carcinogens (Group C - IRIS) "based on an increased incidence of skin papillomas in mice in an initiation-promotion study. The three cresol isomers produced positive results in genetic toxicity studies both alone and in combination." U.S. EPA has not calculated a slope factor for these chemicals.

Quantifying lead's cancer risk involves many uncertainties, some of which may be unique to lead. Age, health, nutritional state, body burden, and exposure duration influence the absorption, release, and excretion of lead. It is also felt that current knowledge of lead pharmacokinetics indicates that an estimate derived by standard procedures would not truly describe the potential risk. Thus, the Carcinogen Assessment Group recommends that a numerical estimate not be used(IRIS document for lead and compounds, 12/01/89).

Cadmium, nickel, and chromium (VI) are carcinogens via inhalation and not ingestion. Slope factors for oral exposure were not calculated by the U.S. EPA Carcinogen Assessment Group for cadmium, nickel, and chromium VI. The inhalation pathway was not quantified in this assessment, so oral slope factors were not needed for cadmium, nickel, or chromium.

There is insufficient evidence of carcinogenicity associated with the following chemicals detected at the Skinner property (IRIS, HEAST, and/or ECAO, Appendix H):

acenaphthene	endrin ketone
antimony	heptachloronorborene
aluminum	2-hexanone
benzyl alcohol	iron
barium	2-methylnaphthalene
bis(2-chloroisopropyl)ether	octachlorocyclopentene
carbon disulfide	4-methyl-2-pentanone
chlordene	sodium
cobalt	tin
di-n-octyl phthalate	vanadium

Slope factors for these chemicals were not calculated because of this lack of evidence of carcinogenicity.

4.4 UNCERTAINTIES RELATED TO TOXICITY INFORMATION

As part of the hazard identification step of the toxicity assessment, U.S. EPA gathered evidence from a variety of sources regarding the potential for a substance to cause adverse health effects (carcinogenic and noncarcinogenic) in humans. These sources included controlled epidemiologic investigations, clinical studies, and experimental animal studies. Supporting information was obtained from sources such as *in vitro* test results and comparisons of structure-activity relationships.

Uncertainty factors associated with the calculation of oral reference doses are listed in Table 4.3. These factors reflect the uncertainty associated with the database used to calculate these values, and were obtained from HEAST, IRIS, or derived from literature using calculations based on U.S. EPA guidance. In general, higher uncertainty factors are applied when animal data are used in the determination of these values; the use of reliable human data is associated with lower uncertainty factors. Uncertainty arising in extrapolating from animal data can be due to differences in chemical uptake, distribution, and metabolism; differences in enzyme subspecies and differences in relative surface area to body weight ratios. When human data are used to calculate reference doses, safety factors are still applied to reflect the relative quantity or quality of the data or to protect from intra-species variations, such as allergic or hypersensitive responses in some individuals. Uncertainty may also result from low confidence in laboratory experimental or epidemiological methodologies.

Additional uncertainties arise when toxicity values are extrapolated from one chemical to another based on similar chemical structure and activity. Conservative assumptions are used when comparisons are made based on structure and activity relationships. For example, the total chromium toxicity value is assumed to be equal to that of the most toxic valence state chromium compound, chromium VI.

The lack of toxicity data for some of the chemicals present at the Skinner site results in the possibility of human exposure not being evaluated for all of the chemicals. The possibility therefore exists that the total risk has been underestimated. However, since many of the chemicals lack *either* slope factors or reference doses, the likelihood of the most serious health risk of the chemical exposure not being evaluated is reduced. The contaminants with no toxicity data available to estimate any type of health risk are not likely to be extremely toxic by the acute route of exposure or evidence of industrial accidents during manufacture or laboratory accidents during analysis would have been found in the literature.

Slope factors calculated by U.S. EPA for potential carcinogens have inherent uncertainty because they are calculations of lifetime cancer risks based on less-than-lifetime exposures and low-dose extrapolations.

As explained in the Risk Characterization (Section 5.0), the summation of cancer risks from each chemical to establish the overall risk of cancer from the site assumes that the carcinogenic properties for all of the chemicals are indeed additive. This assumption probably overestimates the actual cancer risk as several of the carcinogens exert their effects on different systems or target organs. Similarly, the summation of all non-carcinogenic effects likely overestimates the total chronic health effects.

There are opportunities for interactions between chemicals at the Skinner Landfill. However, little or no information is available on the thousands of potential interactions. Synergism between chemicals occurs when the combination of chemicals results in an effect much greater than the sum of effects for each chemical. To not account for chemical synergism when it occurs would underestimate the overall risk to human health. For example, combinations of carbon tetrachloride and isopropanol or ethanol exhibit synergistic properties (Klaassen, *et al*, 1986) which result in an increased hepatotoxicity. Neither isopropanol nor ethanol were detected at Skinner Landfill. Antagonism is the effect of one chemical on the actions of another chemical which decreases the overall effects of both chemicals. To not account for chemical antagonism when it occurs would overestimate the overall risk to human health. The degree to which synergistic and antagonistic interactions among chemicals present at Skinner Landfill affect exposed populations is unknown, and therefore not quantified.

Inadequate carcinogenic and/or non-carcinogenic toxicity information was available for several chemicals as explained in Section 4.3. Possible health effects of these chemicals and consequences of their exclusion from the risk assessment are unknown.

4.5 SUMMARY OF TOXICITY ASSESSMENT

The toxicity assessment identified the appropriate toxicity values for each chemical of potential concern, including chronic and sub-chronic reference doses and slope factors. The available reference doses and carcinogenic slope factors for the chemicals of concern are presented in Tables 4-1 through 4-3. The IRIS database (U.S. EPA, 1989b) and the Health Effects Assessment Summary Tables (HEAST; U.S. EPA, 1990a), and the U.S. EPA Environmental Criteria and Assessment Office (ECAO) were consulted for information. Inadequate carcinogenic and/or non-carcinogenic toxicity information was available for several chemicals of concern. The possible health effects of these chemicals and consequences of their exclusion from the risk assessment are unknown.

Tables

TABLE 4-1
CARCINOGENIC SLOPE FACTORS FOR CHEMICALS OF CONCERN
Skinner Landfill

CAS RN	Chemical	Oral Route				Inhalation Route			
		Weight of Evidence	Slope Factor (mg/kg/day)-1	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-1*	Source	Date
83-32-9	Acenaphthene	-	NA	IRIS/ECAO	3/13/91	-	NA	IRIS/ECAO	3/13/91
208-96-8	Acenaphthylene	D	NA	ECAO	3/13/91	D	NA	ECAO	3/13/91
67-64-1	Acetone	D	NA	ECAO	3/13/91	D	NA	ECAO	3/13/91
309-00-2	Aldrin	B2	1.7 E+1	IRIS	1/1/91	B2	4.9 E-3/ug/cu.m	IRIS	1/1/91
7429-90-5	Aluminum	-	NA	ECAO	3/13/91	-	NA	IRIS/ECAO	3/13/91
120-12-7	Anthracene	D	NA	ECAO	3/13/91	D	NA	ECAO	3/13/91
7440-36-0	Antimony	-	NA	IRIS/ECAO	3/13/91	-	NA	IRIS/ECAO	3/13/91
12672-29-6	Aroclor-1248 (2)	B2	7.7 E+0	IRIS/ECAO	3/13/91	B2	NA	IRIS/ECAO	3/13/91
11097-69-1	Aroclor-1254 (2)	B2	7.7 E+0	IRIS/ECAO	3/13/91	B2	NA	IRIS/ECAO	3/13/91
11096-82-5	Aroclor-1260 (2)	B2	7.7 E+0	IRIS/ECAO	3/13/91	B2	NA	IRIS/ECAO	3/13/91
7440-38-2	Arsenic	A	1.75 E+0 (3)	IRIS	12/1/88	A	5.0 E+1	IRIS	12/1/88
7440-39-3	Barium	-	NA	IRIS/ECAO	3/13/91	-	NA	IRIS/ECAO	3/13/91
71-43-2	Benzene	A	2.9 E-2	IRIS	7/1/89	A	2.9 E-2	IRIS	7/1/89
56-55-3	Benzo(a)anthracene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
65-85-0	Benzoic Acid	D	NA	IRIS	8/1/89	D	NA	IRIS	8/1/89
205-99-2	Benzo(b)fluoranthene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
207-08-9	Benzo(k)fluoranthene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
191-24-2	Benzo(g,h,i)perylene	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
50-32-8	Benzo(a)pyrene	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
100-51-6	Benzyl alcohol	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
7440-41-7	Beryllium	B2	4.3 E+0	IRIS	9/1/90	B2	8.4 E+0	IRIS	9/1/90
111-44-4	Bis(2-chloroethyl)ether	B2	1.1 E+0	IRIS	11/1/89	B2	1.1 E+0	IRIS	11/1/89
39638-32-9	Bis(2-chloroisopropyl)ether	-	Not evaluated	IRIS	11/1/89	-	Not evaluated	IRIS	11/1/89
117-81-7	Bis(2-ethylhexyl)phthalate	B2	1.4 E-2	IRIS	8/1/89	B2	NA	IRIS	8/1/89

TABLE 4-1
CARCINOGENIC SLOPE FACTORS FOR CHEMICALS OF CONCERN
Skinner Landfill

CAS RN	Chemical	Oral Route				Inhalation Route			
		Weight of Evidence	Slope Factor (mg/kg/day)-[1]	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-[1*]	Source	Date
78-93-3	2-Butanone (MEK)	D	NA	IRIS	6/1/90	D	NA	IRIS	6/1/90
85-68-7	Butyl benzyl phthalate	C	NA	IRIS	9/1/89	C	NA	IRIS	9/1/89
7440-43-9	Cadmium	-	NA	IRIS/ECAO	3/13/91	B1	6.1 E+0	IRIS	12/1/89
75-15-0	Carbon disulfide	-	Not evaluated	IRIS	9/1/90	-	Not evaluated	IRIS	9/1/90
56-23-5	Carbon tetrachloride	B2	1.3 E-1	IRIS	12/1/89	B2	1.3 E-1	IRIS	12/1/89
57-74-9	Chlordane (alpha, gamma) (9)	B2	1.3 E+0	IRIS	8/1/90	B2	1.3 E+0	IRIS	8/1/90
3734-48-3	Chlordene	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
108-90-7	Chlorobenzene	D	NA	IRIS	11/1/90	D	NA	IRIS	11/1/90
75-00-3	Chloroethane (5)	D	NA	ECAO	7/6/90	D	NA	ECAO	7/6/90
67-66-3	Chloroform	B2	6.1 E-3	IRIS	10/1/89	B2	8.1 E-2	IRIS	10/1/89
7440-47-3	Chromium (6)	-	NA	IRIS/ECAO	3/13/91	A	4.1 E+1	IRIS	12/1/89
218-01-9	Chrysene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
7440-48-4	Cobalt	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
7440-50-8	Copper	D	NA	IRIS	12/1/88	D	NA	IRIS	12/1/88
57-12-5	Cyanide, free	D	NA	IRIS	1/1/90	D	NA	IRIS	1/1/90
72-54-8	DDD	B2	2.4 E-1	IRIS	8/1/89	B2	NA	IRIS	8/1/89
72-55-9	DDE	B2	3.4 E-1	IRIS	8/1/89	B2	NA	IRIS	8/1/89
50-29-3	DDT	B2	3.4 E-1	IRIS	8/22/88	B2	3.4 E-1	IRIS	8/22/88
53-70-3	Dibenz(a,h)anthracene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
132-64-9	Dibenzofuran	D	NA	IRIS	10/1/90	D	NA	IRIS	10/1/90
95-50-1	1,2-Dichlorobenzene	D	NA	IRIS	11/1/90	D	NA	IRIS	11/1/90
541-73-1	1,3-Dichlorobenzene	D	NA	IRIS	10/1/90	D	NA	IRIS	10/1/90
106-46-7	1,4-Dichlorobenzene	B2	2.4 E-2	HEAST	6/1/90	B2	NA	HEAST	6/1/90
75-34-3	1,1-Dichloroethane	C	NA	IRIS	10/1/90	C	NA	IRIS	10/1/90

TABLE 4-1
CARCINOGENIC SLOPE FACTORS FOR CHEMICALS OF CONCERN
Skinner Landfill

CAS RN	Chemical	Oral Route				Inhalation Route			
		Weight of Evidence	Slope Factor (mg/kg/day)-1	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-1*	Source	Date
107-06-2	1,2-Dichloroethane	B2	9.1 E-2	IRIS	8/1/89	B2	9.1 E-2	IRIS	8/1/89
75-35-4	1,1-Dichloroethene	C	6.0 E-1	IRIS	3/1/90	C	1.2 E+0	IRIS	3/1/90
156-60-5	1,2-Dichloroethene (7)	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
78-87-5	1,2-Dichloropropane	B2	6.8 E-2	HEAST	6/1/90	B2	NA	HEAST	6/1/90
60-57-1	Dieldrin	B2	1.6 E+1	IRIS	1/1/91	B2	4.6 E-3/ug/cu.m	IRIS	1/1/91
84-66-2	Diethyl phthalate	D	NA	IRIS	8/1/89	D	NA	IRIS	8/1/89
131-11-3	Dimethyl phthalate	D	NA	IRIS	10/1/90	D	NA	IRIS	10/1/90
84-74-2	Di-n-butylphthalate	D	NA	IRIS	8/1/90	D	NA	IRIS	8/1/90
117-84-0	Di-n-octyl phthalate	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
72-20-8	Endrin	D	NA	IRIS	10/1/89	D	NA	IRIS	10/1/89
53494-70-5	Endrin ketone	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
100-41-4	Ethylbenzene	D	NA	IRIS	8/1/89	D	NA	IRIS	8/1/89
206-44-0	Fluoranthene	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
86-73-7	Fluorene	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
76-44-8	Heptachlor	B2	4.5 E+0	IRIS	3/1/88	B2	4.5 E+0	IRIS	3/1/88
5202-36-8	Heptachloronorborene	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
118-74-1	Hexachlorobenzene	B2	1.6 E+0	HEAST	6/1/90	B2	1.6 E+0	HEAST	6/1/90
87-68-3	Hexachlorobutadiene	C	7.8 E-2	IRIS	8/1/90	C	7.8 E-2	IRIS	8/1/90
319-85-7	beta-Hexachlorocyclohexane	C	1.8 E+0	IRIS	1/1/90	C	1.8 E+0	IRIS	1/1/90
77-47-4	Hexachlorocyclopentadiene	D	NA	IRIS	9/1/90	D	NA	IRIS	9/1/90
67-72-1	Hexachloroethane	C	1.4 E-2	IRIS	6/30/88	C	1.4 E-2	IRIS	6/30/88
591-78-6	2-Hexanone	-	NA	IRIS/HEAST	9/1/90	-	NA	IRIS/HEAST	9/1/90
193-39-5	Indeno(1,2,3-cd)pyrene (1)	B2	1.15 E+1	ECAO	11/30/90	B2	6.1 E+0	ECAO	11/30/90
7439-92-1	Lead	B2	NA	IRIS/ECAO	3/13/91	B2	NA	IRIS/ECAO	3/13/91

TABLE 4-1
CARCINOGENIC SLOPE FACTORS FOR CHEMICALS OF CONCERN
Skinner Landfill

CAS RN	Chemical	Oral Route				Inhalation Route			
		Weight of Evidence	Slope Factor (mg/kg/day)-1	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-1*	Source	Date
7439-96-5	Manganese	D	NA	IRIS	9/1/90	D	NA	IRIS	9/1/90
7439-97-6	Mercury, inorganic	D	NA	IRIS	12/1/89	D	NA	IRIS	12/1/89
75-09-2	Methylene chloride	B2	7.5 E-3	IRIS	9/1/90	B2	NA	IRIS	9/1/90
91-57-6	2-Methylnaphthalene	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
108-10-1	4-Methyl-2-Pentanone(MIBK)	-	NA	IRIS/ECAO	3/13/91	-	NA	IRIS/ECAO	3/13/91
95-48-7	2-Methylphenol	C	NA	IRIS	10/1/90	C	NA	IRIS	10/1/90
106-44-5	4-Methylphenol	C	NA	IRIS	10/1/90	C	NA	IRIS	10/1/90
91-20-3	Naphthalene	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
	Nickel (refinery dust)	-	NA	IRIS/ECAO	3/13/91	A	2.4 E-4/ug/cu.m	IRIS	1/1/91
98-95-3	Nitrobenzene	D	NA	IRIS	1/1/91	D	NA	IRIS	1/1/91
706-78-5	Octachlorocyclopentene	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
87-86-5	Pentachlorophenol	B2	1.2 E-1	HEAST/ECAO	3/13/91	B2	NA	HEAST	9/190
85-01-8	Phenanthrene	D	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
108-95-2	Phenol	D	NA	IRIS	11/1/90	D	NA	IRIS	11/1/90
129-00-0	Pyrene	D	NA	ECAO	3/13/91	D	NA	ECAO	3/13/91
7440-22-4	Silver	D	NA	IRIS	8/1/89	D	NA	IRIS	8/1/89
1746-01-6	2,3,7,8-TCDD (8)	B2	1.5 E+5	HEAST	6/1/90	B2	1.5 E+5	HEAST	6/1/90
79-34-5	1,1,2,2-Tetrachloroethane	C	2.0 E-1	IRIS	8/1/89	C	2.0 E-1	IRIS	8/1/89
127-18-4	Tetrachloroethylene	B2	5.1 E-2	HEAST	6/1/90	B2	3.3 E-3	HEAST	6/1/90
7440-28-0	Thallium	D	NA	IRIS	9/1/90	D	NA	IRIS	9/1/90
7440-31-5	Tin	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
108-88-3	Toluene	D	NA	IRIS	8/1/90	D	NA	IRIS	8/1/90
71-55-6	1,1,1-Trichloroethane	D	NA	IRIS	6/1/89	D	NA	IRIS	6/1/89

TABLE 4-1
CARCINOGENIC SLOPE FACTORS FOR CHEMICALS OF CONCERN
Skinner Landfill

CAS RN	Chemical	Oral Route				Inhalation Route			
		Weight of Evidence	Slope Factor (mg/kg/day)-[1]	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-[1]*	Source	Date
79-00-5	1,1,2-Trichloroethane	C	5.7 E-2	IRIS	9/26/88	C	5.7 E-2	IRIS	9/26/88
79-01-6	Trichloroethylene	B2	1.1 E-2	HEAST	6/1/90	B2	1.7 E-2	HEAST	6/1/90
7440-62-2	Vanadium	-	NA	ECAO	3/13/91	-	NA	ECAO	3/13/91
75-01-4	Vinyl chloride	A	1.9 E+0	HEAST	9/1/90	A	8.4 E-5/ug/cu.m	HEAST	9/1/90
1330-20-7	Xylene	D	NA	IRIS	7/1/89	D	NA	IRIS	7/1/89
7440-66-6	Zinc	D	NA	ECAO	3/13/91	D	NA	ECAO	3/13/91

*Inhalation unit risk values are noted where applicable.

(1) Values used are those of benzo(a)pyrene (ECAO recommendation, 11-30-90; Appendix E).

(2) Values used are those of polychlorinated biphenyls (CASRN 1336-36-3) (ECAO, 3/8/91, Appendix E)

(3) Calculated from unit risk value

(5) Classification received from ECAO, 7-6-90 (Appendix E)

(6) Values used are those of chromium (VI).

(7) Values used are those of cis-1,2-dichloroethene.

(8) Value used for all chlorinated dibenzo-p-dioxins and dibenzofurans after calculation of toxicity equivalency factor for each congener.

(9) Values used are those of total Chlordane.

IRIS - Integrated Risk Information System. U.S. EPA database (accessed Dec./90). IRIS classifications:

Group A - Human carcinogen

Group B1 - Probable human carcinogen--limited human data and sufficient evidence in animals.

Group B2 - Probable human carcinogen--combination of sufficient evidence in animals and inadequate or no evidence in humans.

Group C - Possible human carcinogen

Group D - Not classified--inadequate animal evidence of carcinogenicity.

HEAST - Health Effects Assessment Summary Tables, Fourth Quarter, FY 1990, U.S. EPA 1990.

ECAO - Environmental Criteria and Assessment Office - correspondence 7/6/90, 11/30/90, 3/13/91 (Appendix E).

NA = Not available

- = Not Applicable

TABLE 4-2
INHALATION TOXICITY VALUES OF VOLATILE CHEMICALS OF CONCERN
(FOR USE IN SHOWER MODEL)
Skinner Landfill

CAS RN	Chemical	Inhalation Reference Concentration				Inhalation Slope Factors			
		Sub-Chronic (mg/m^3)	Chronic (mg/m^3)	Source	Date	Weight of Evidence	Slope Factor $(mg/kg/day)^{-1}$	Source	Date
67-64-1	Acetone	NA	NA	IRIS	1/1/90	-	NA	IRIS	1/1/90
71-43-2	Benzene	NA	NA	IRIS	7/1/89	A	2.9 E-2	IRIS	7/1/89
100-51-6	Benzyl alcohol	NA	NA	HEAST	9/1/90	-	NA	HEAST	9/1/90
111-44-4	Bis(2-chloroethyl)ether	NA	NA	IRIS	11/1/89	B2	1.1 E+0	IRIS	11/1/89
78-93-3	2-Butanone (MEK)	3.0 E+0	3.0 E-1	HEAST	9/1/90	D	NA	IRIS	6/1/90
56-23-5	Carbon tetrachloride	NA	NA	IRIS	12/1/89	B2	1.3 E-1	IRIS	12/1/89
108-90-7	Chlorobenzene	2.0 E-1	2.0 E-2	HEAST	9/1/90	D	NA	IRIS	11/1/90
75-00-3	Chloroethane (1)	NA	NA	IRIS/HEAST	9/1/90	D	NA	ECAO	7/6/90
67-66-3	Chloroform	NA	NA	IRIS	10/1/89	B2	8.1 E-2	IRIS	10/1/89
95-50-1	1,2-Dichlorobenzene	2.0 E+0	2.0 E-1	HEAST	9/1/90	D	NA	IRIS	11/1/90
106-46-7	1,4-Dichlorobenzene	7.0 E-1	7.0 E-1	HEAST	9/1/90	C	NA	HEAST	9/1/90
75-34-3	1,1-Dichloroethane	5.0 E+0	5.0 E-1	HEAST	9/1/90	C	NA	HEAST	9/1/90
107-06-2	1,2-Dichloroethane	NA	NA	IRIS	8/1/89	B2	9.1 E-2	IRIS	8/1/89
156-60-5	1,2-Dichloroethene (2)	NA	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
78-87-5	1,2-Dichloropropane	NA	NA	HEAST	9/1/90	B2	NA	HEAST	9/1/90
100-41-4	Ethylbenzene	1.0 E+0	1.0 E+0	IRIS	3/1/91	D	NA	IRIS	3/1/91
75-09-2	Methylene chloride	3.0 E+0	3.0 E+0	HEAST	9/1/90	B2	1.4 E-2	HEAST	9/1/90
95-48-7	2-Methylphenol	NA	NA	IRIS	10/1/90	C	NA	IRIS	10/1/90
106-44-5	4-Methylphenol	NA	NA	IRIS	10/1/90	C	NA	IRIS	10/1/90
91-20-3	Naphthalene	NA	NA	IRIS	12/1/90	D	NA	IRIS	12/1/90
108-95-2	Phenol	NA	NA	IRIS	3/1/91	D	NA	IRIS	3/1/91
79-34-5	1,1,2,2-Tetrachloroethane	NA	NA	IRIS	8/1/89	C	2.0 E-1	IRIS	8/1/89
127-18-4	Tetrachloroethylene	NA	NA	IRIS	7/1/89	B2	1.8 E-3	HEAST	9/1/90

TABLE 4-2
INHALATION TOXICITY VALUES OF VOLATILE CHEMICALS OF CONCERN
(FOR USE IN SHOWER MODEL)
Skinner Landfill

CAS RN	Chemical	Inhalation Reference Concentration				Inhalation Slope Factors			
		Sub-Chronic (mg/m³)	Chronic (mg/m³)	Source	Date	Weight of Evidence	Slope Factor (mg/kg/day)-1	Source	Date
108-88-3	Toluene	2.0 E+0	2.0 E+0	HEAST	9/1/90	D	NA	IRIS	8/1/90
71-55-6	1,1,1-Trichloroethane	1.0 E+1	1.0 E+0	HEAST	9/1/90	D	NA	IRIS	6/1/89
79-00-5	1,1,2-Trichloroethane	NA	NA	IRIS	9/26/88	C	5.7 E-2	IRIS	9/26/88
79-01-6	Trichloroethylene	NA	NA	IRIS	12/1/89	B2	1.7 E-2	HEAST	9/1/90
75-01-4	Vinyl chloride	NA	NA	IRIS/HEAST	9/1/90	A	2.9 E-1	HEAST	9/1/90
1330-20-7	Xylene, total	3.0 E-1	3.0 E-1	HEAST	9/1/90	D	NA	IRIS	7/1/89

(1) Classification received from Environmental Criteria and Assessment Office (ECAO); see Appendix E

(2) Values used are those of cis-1,2-dichloroethene.

IRIS - Integrated Risk Information System. U.S. EPA 1988. Weight of evidence classifications:

A - Human carcinogen

B2 - Probable human carcinogen--combination of sufficient evidence in animals and inadequate data in humans.

C - Possible human carcinogen

D - Not classified--inadequate animal evidence of carcinogenicity.

HEAST - Health Effects Assessment Summary Tables, Fourth Quarter, FY 1990, U.S. EPA.

NA = Not available

- = Not Applicable

TABLE 4-3
REFERENCE DOSES FOR CHEMICALS OF CONCERN
Skinner Landfill

Chemical	Oral Reference Dose (mg/kg/day)		Source(1)	Date	Critical Effect	UF	MF	Confidence in RfD
	Sub-Chronic	Chronic						
Acenaphthene	6.0 E-1	6.0 E-2	IRIS	11/1/90	Hepatotoxicity	3,000	1	Low
Acenaphthylene (6)	4.0 E-2	4.0 E-3	HEAST/ECAO	3/13/91	Ocular and internal lesions	10,000		
Acetone	1.0 E+0 *	1.0 E-1	IRIS	1/1/90	Increased liver and kidney weights	1,000	1	Low
Aldrin	3.0 E-5	3.0 E-5	IRIS	1/1/91	Liver toxicity in rats	1,000	1	Medium
Aluminum	NA	NA	ECAO	3/13/91				
Anthracene	3.0 E+0	3.0 E-1	IRIS	9/1/90	No observed effects	3,000	1	Low
Antimony	4.0 E-4	4.0 E-4	IRIS	9/1/89	Longevity, glucose, cholesterol	1,000	1	Low
Aroclor-1248 (8)	1.0 E-3*	1.0 E-4	ECAO	3/13/91	Decreased birth weight in monkeys			
Aroclor-1254 (8)	1.0 E-3*	1.0 E-4	ECAO	3/13/91	Decreased birth weight in monkeys			
Aroclor-1260 (8)	1.0 E-3*	1.0 E-4	ECAO	3/13/91	Decreased birth weight in monkeys			
Arsenic	1.0 E-3	1.0 E-3	HEAST	9/1/90	Keratosis, hyperpigmentation	1		
Barium	5.0 E-2	7.0 E-2	IRIS	8/1/90	Increased blood pressure	3	1	Medium
Benzene (2)	NA	NA	ECAO	3/13/91				
Benzo(a)anthracene (2)	NA	NA	ECAO	3/13/91				
Benzoic Acid	4.0 E+0	4.0 E+0	IRIS	8/1/89	Human daily per capita intakes	1	1	Medium
Benzo(b)fluoranthene (2)	NA	NA	ECAO	3/13/91				
Benzo(k)fluoranthene (2)	NA	NA	ECAO	3/13/91				
Benzo(g,h,i)perylene (6)	4.0 E-2	4.0 E-3	HEAST/ECAO	3/13/91	Ocular and internal lesions	10,000		
Benzo(a)pyrene (2)	NA	NA	ECAO	3/13/91				
Benzyl alcohol	1.0 E+0	3.0 E-1	HEAST	9/1/90	Hyperplasia of forestomach	1,000		
Beryllium	5.0 E-3	5.0 E-3	IRIS	9/1/90	No adverse effects	100	1	Low
Bis(2-chloroethyl)ether (2)	NA	NA	ECAO	3/13/91				
Bis(2-chloroisopropyl)ether	4.0 E-2	4.0 E-2	IRIS	11/1/89	Decreased hemoglobin	1,000	1	Low
Bis(2-ethylhexyl)phthalate	2.0 E-2	2.0 E-2	IRIS	8/1/89	Increased relative liver weight	1,000	1	Medium

TABLE 4-3
REFERENCE DOSES FOR CHEMICALS OF CONCERN
Skinner Landfill

Chemical	Oral Reference Dose (mg/kg/day)		Source(1)	Date	Critical Effect	UF	MF	Confidence in RfD
	Sub-Chronic	Chronic						
2-Butanone (MEK)	5.0 E-1	5.0 E-2	IRIS	6/1/90	No adverse effects observed	1,000	1	Medium
Butyl benzyl phthalate	2.0 E+0	2.0 E-1	IRIS	9/1/89	Increased liver and brain weights	1,000	1	Low
Cadmium (water)	5.0 E-3 *	5.0 E-4	IRIS	12/1/89	Significant proteinuria	10	1	High
Cadmium (food)	1.0 E-2 *	1.0 E-3	IRIS	12/1/89	Chronic exposures to humans	10	1	High
Carbon disulfide	1.0 E-1	1.0 E-1	IRIS	9/1/90	Fetal toxicity/ malformations	100	1	Medium
Carbon tetrachloride	7.0 E-3	7.0 E-4	IRIS	12/1/89	Liver lesions	1,000	1	Medium
Chlordane (alpha, gamma)(3)	6.0 E-5	6.0 E-5	IRIS/ECAO	3/13/91	Liver hypertrophy in females	1,000	1	Low
Chlordene (3)	6.0 E-5	6.0 E-5	IRIS/ECAO	3/13/91	Liver hypertrophy in females	1,000	1	Low
Chlorobenzene	2.0 E-1	2.0 E-2	IRIS	11/1/90	Histopathologic changes in liver	1,000	1	Medium
Chloroethane	NA	NA	ECAO	3/13/91				
Chloroform	1.0 E-2	1.0 E-2	IRIS	10/1/89	Fatty cyst formation in liver	1,000	1	Medium
Chromium (4)	2.0 E-2	5.0 E-3	IRIS/ECAO	3/13/91	No effects reported	500	1	Low
Chrysene (2)	NA	NA	ECAO	3/13/91				
Cobalt	1 E-4*	1 E-5	ECAO	3/13/91	LOAEL for allergic dermatitis response	1,000		
Copper	NA	NA	HEAST**	9/1/90	Local gastrointestinal irritation			
Cyanide, free	2.0 E-2	2.0 E-2	IRIS	1/1/90	Rat chronic oral study	100	5	Medium
DDD (2)	NA	NA	ECAO	3/13/91				
DDE (2)	NA	NA	ECAO	3/13/91				
DDT	5.0 E-4	5.0 E-4	IRIS	8/22/88	Liver lesions	100	1	Medium
Dibenz(a,h)anthracene (2)	NA	NA	IRIS/HEAST	2/1/91				
Dibenzofuran	1.0 E-2*	1.0 E-3	ECAO	3/13/91	LOAEL for organ weight in rats	10,000		
1,2-Dichlorobenzene	9.0 E-1	9.0 E-2	IRIS	11/1/90	No adverse effects observed	1,000	1	Low
1,3-Dichlorobenzene	8.9 E-1*	8.9 E-2	ECAO	3/13/91				
1,4-Dichlorobenzene (2)	NA	NA	IRIS/HEAST	9/1/90				

TABLE 4-3
REFERENCE DOSES FOR CHEMICALS OF CONCERN
Skinner Landfill

Chemical	Oral Reference Dose (mg/kg/day)		Source(1)	Date	Critical Effect	UF	MF	Confidence in RfD
	Sub-Chronic	Chronic						
1,1-Dichloroethane	1.0 E+0	1.0 E-1	HEAST	9/1/90	No adverse effects observed	100		
1,2-Dichloroethane (2)	NA	NA	ECAO	3/13/91				
1,1-Dichloroethene	9.0 E-3	9.0 E-3	IRIS	3/1/90	Hepatic lesions in rats	1,000	1	Medium
1,2-Dichloroethene (5)	1 E-1	1 E-2	ECAO	3/13/91				
1,2-Dichloropropane	9.0 E-1*	9.0 E-2	ECAO	3/13/91	LOAEL for liver effects in mice			
Dieldrin	5.0 E-5	5.0 E-5	IRIS	1/1/91	Liver lesions in rats	100	1	Medium
Diethyl phthalate	8.0 E+0	8.0 E-1	IRIS	8/1/89	Decreased growth rate	1,000	1	Low
Dimethyl phthalate	1.0 E+0	1.0 E+0	HEAST	9/1/90	Growth and nephritic effects	100		
Di-n-butylphthalate	1.0 E+0	1.0 E-1	IRIS	8/1/90	Increased mortality	1,000	1	Low
Di-n-octyl phthalate	2.0 E-2	2.0 E-2	HEAST	9/1/90	Increased liver and kidney weights	1,000	•	
Endrin	5.0 E-4	3.0 E-4	IRIS	10/1/89	Liver lesions, convulsions	100	1	Medium
Endrin ketone	NA	NA	ECAO	3/13/91				
Ethylbenzene	1.0 E+0	1.0 E-1	IRIS	8/1/89	Liver and kidney toxicity	1,000	1	Low
Fluoranthene	4.0 E-1	4.0 E-2	IRIS	12/1/90	Nephropathy,hematological effects	3,000	1	Low
Fluorene	4.0 E-1	4.0 E-2	IRIS	12/1/90	Decreased red blood cells, hemaglobin	3,000	1	Low
Heptachlor	5.0 E-4	5.0 E-4	IRIS	3/1/88	Increased liver weights in males	300	1	Low
Heptachloronorborene	NA	NA	ECAO	3/13/91				
Hexachlorobenzene	8.0 E-4	8.0 E-4	IRIS	6/1/90	Liver effects	100	1	Medium
Hexachlorobutadiene	2.0 E-3	2.0 E-3	IRIS	8/1/90	Kidney toxicity	100	1	Low
beta-Hexachlorocyclohexane(2	NA	NA	IRIS/HEAST	9/1/90				
Hexachlorocyclopentadiene	7.0 E-2	7.0 E-3	IRIS	9/1/90	Stomach lesions	1,000	1	Low
Hexachloroethane	1.0 E-2	1.0 E-3	IRIS	6/30/88	Atrophy, renal tubule toxicity	1,000	1	Medium
2-Hexanone	NA	NA	IRIS/HEAST	9/1/90				
Indeno(1,2,3-cd)pyrene (2)	NA	NA	ECAO	3/13/91				

TABLE 4-3
REFERENCE DOSES FOR CHEMICALS OF CONCERN
Skinner Landfill

Chemical	Oral Reference Dose (mg/kg/day)		Source(1)	Date	Critical Effect	UF	MF	Confidence in RfD
	Sub-Chronic	Chronic						
Lead	NA	NA	ECAO	3/13/91				
Manganese	5.0 E-1	1.0 E-1	IRIS	9/1/90	Central nervous system effects	1	1	Medium
Mercury, inorganic	3.0 E-4	3.0 E-4	HEAST	9/1/90	Neurotoxicity, kidney effects	1,000		
Methylene chloride	6.0 E-2	6.0 E-2	IRIS	9/1/90	Liver toxicity	100	1	Medium
2-Methylnaphthalene	NA	NA	ECAO	3/13/91				
4-Methyl-2-Pentanone(MIBK)	5.0 E-1	5.0 E-2	IRIS	4/1/90	Liver, kidney weights/nephrotoxicity	1,000	1	Low
2-Methylphenol	5.0 E-1	5.0 E-2	IRIS	10/1/90	Decreased body weight/neurotoxicity	1,000	1	Medium
4-Methylphenol	5.0 E-1	5.0 E-2	IRIS	10/1/90	Decreased body weight/neurotoxicity	1,000	1	Medium
Naphthalene	4.0 E-2	4.0 E-3	HEAST	9/1/90	Ocular and internal lesions	10,000		
Nickel, soluble salts	2.0 E-2	2.0 E-2	IRIS	12/1/89	Decreased body and organ weights	100	3	Medium
Nitrobenzene	5.0 E-3	5.0 E-4	IRIS	1/1/91	Adrenal, renal and hepatic lesions	10,000	1	Low
Octachlorocyclopentene	NA	NA	ECAO	3/13/91				
Pentachlorophenol	3.0 E-2	3.0 E-2	IRIS	6/30/88	Liver and kidney pathology	100	1	Medium
Phenanthrene (6)	4.0 E-2	4.0 E-3	HEAST/ECAO	3/13/91	Ocular and internal lesions	10,000		
Phenol	6.0 E-1	6.0 E-1	IRIS	11/1/90	Reduced fetal body weight in rats	100	1	Low
Pyrene	3.0 E-1	3.0 E-2	IRIS	9/1/90	Kidney effects	3,000	1	Low
Silver	3.0 E-3	3.0 E-3	IRIS	8/1/89	Permanent discoloration of the skin	2	1	Medium
2,3,7,8-TCDD (7)	1.0 E-8*	1.0 E-9	ECAO	3/13/91				Low
1,1,2,2-Tetrachloroethane (2)	NA	NA	ECAO	3/13/91				
Tetrachloroethylene	1.0 E-1	1.0 E-2	IRIS	7/1/89	Hepatotoxicity	100	1	Medium
Thallium, soluble salts	7.0 E-4	7.0 E-5	HEAST	9/1/90	Increased enzyme levels, hair loss	3,000		
Tin	6.0 E-1	6.0 E-1	HEAST	9/1/90	Liver and kidney lesions	100		
Toluene	2.0 E+0	2.0 E-1	IRIS	8/1/90	Changes in liver and kidney weight	1,000	1	Medium

TABLE 4-3
REFERENCE DOSES FOR CHEMICALS OF CONCERN
Skinner Landfill

Chemical	Oral Reference Dose (mg/kg/day)		Source(1)	Date	Critical Effect	UF	MF	Confidence in RfD
	Sub-Chronic	Chronic						
1,1,1-Trichloroethane	9.0 E-1	9.0 E-2	IRIS	6/1/89	No adverse effects	1,000	1	Medium
1,1,2-Trichloroethane	4.0 E-2	4.0 E-3	IRIS	9/26/88	Clinical serum chemistry	1,000	1	Medium
Trichloroethylene	7.35 E-2*	7.35 E-3	ECAO	3/13/91	LOAEL in 14-week inhalation study			
Vanadium	7.0 E-3	7.0 E-3	HEAST	9/1/90	No observed effects	100		
Vinyl chloride (2)	NA	NA	IRIS/HEAST	12/1/90				
Xylenes, mixed	4.0 E+0	2.0 E+0	IRIS	7/1/89	Hyperactivity, increased mortality	100	1	Medium
Zinc	2.0 E-1	2.0 E-1	HEAST	9/1/90	Anemia	10		

* See footnote (1).

** Current Drinking Water Standard is 1.3 mg/L but the calculation of an RfD is not recommended for copper.

(1) Source for chronic oral reference dose (RfD). Values for subchronic oral reference doses obtained from HEAST unless noted by a (*) which indicates that WWES calculated the subchronic oral RfD by increasing the chronic oral RfD a factor of 10.

(2) RfD not available. See Table 4-1 for slope factor.

(3) Values are those for total Chlordane (ECAO approval)

(4) Values are those for chromium (VI) (ECAO approval).

(5) Values are those for cis-1,2-dichloroethene (ECAO recommendation).

(6) Values are those of naphthalene (ECAO recommendation).

(7) Value used for all chlorinated dibenzo-p-dioxins and dibenzofurans after calculation of toxicity equivalency factor for each congener.

(8) Values are those for Aroclor 1016 (ECAO recommendation).

IRIS - Integrated Risk Information System. U.S. EPA database (accessed Dec/90). Confidence rating is either high, medium or low.

HEAST - Health Effects Assessment Summary Tables, Fourth Quarter, FY 1990, U.S. EPA 1990.

ECAO - Environmental Criteria and Assessment Office - Toxicity Information and Methodology Review, 3/13/91 (Appendix E).

UF - Uncertainty Factor.

MF - Modifying Factor.

NA = Not Available